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ENVIRONMENTAL

Richard Nussbaum, P.E., R.G.
Chief, Permits Section – Hazardous Waste Program
Missouri Department of Natural Resources
1738 Elm Street, P.O. Box 176
Jefferson City, MO 65102

Patricia A. Murrow
U.S. Environmental Protection Agency, Region VII
AWMD/RCAP
901 North 5th Street
Kansas City, Kansas 66101

Date:
7 July 2011

Subject:
Submittal of Interim Groundwater Remediation System Construction Complete Report
Formerly American Cyanamid Company Facility near Hannibal, Missouri
EPA ID Number MOD050226075

Contact:
John P. Shonfelt

Phone:
913.492.0900

Email:
john.shonfelt@arcadis-us.com

Our ref:
KC001589.0001

Dear Mr. Nussbaum and Ms. Murrow:

ARCADIS U.S., Inc. (ARCADIS) is submitting the Construction Completion Report for the interim groundwater remediation system at the above referenced facility. Copies have been submitted to both the Missouri Department of Natural Resources (MDNR) and the Environmental Protection Agency (EPA).

If you have any questions regarding the enclosed information, please contact John Shonfelt of ARCADIS at 913.492.0900, extension 11.

Sincerely,

ARCADIS U.S., Inc.

John P. Shonfelt
Senior Project Manager/Hydrogeologist

cc: Mike Dandurand, MDNR
Curt Gardner, BASF
William Winkley, Wyeth

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Former American Cyanamid Company

Construction Completion Report for Groundwater Recovery and Treatment System

Agricultural Products Division Facility
Hannibal, Missouri
EPA ID No. MOD050226075

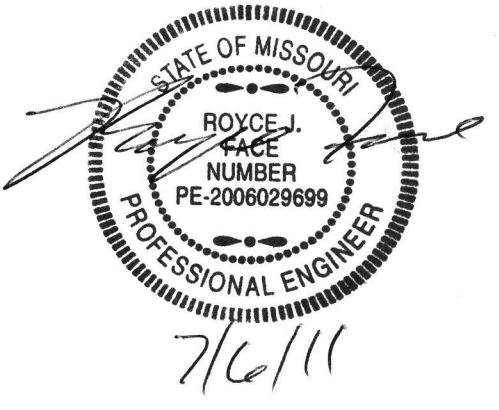
06 July 2011

ARCADIS

Bretton C. Overholtzer, P.E.
Senior Engineer

Royce A. Face, P.E.
Senior Engineer

John P. Shonfelt
Senior Project Manager



7/6/11

Construction Completion Report

Groundwater Recovery and Treatment System

Prepared for:
Former American Cyanamid Company
Agricultural Products Division Facility
Hannibal, Missouri

Prepared by:
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Our Ref.:
KC001575.0001

Date:
July 6, 2011

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Figures

Appendices

1. Introduction

ARCADIS, on behalf of Wyeth Holdings Corporation (a division of Pfizer Inc.) has prepared this Final Construction Completion Report for the Interim Groundwater Corrective Measure implemented at the Agriculture Products Facility (the Site or Facility) near Hannibal, Missouri (Figure 1). This report summarizes the final engineering design and construction activities associated with implementation of interim measures, and includes "as-built" Record Drawings (Appendix A) for the groundwater extraction and treatment system.

1.1 Site Location and Description

The Facility is situated on approximately 2,200 acres of land on the west bank of the Mississippi River. The site is located along Route JJ in Marion County, approximately 10 miles northwest of Hannibal, Missouri and five miles southwest of Quincy, Illinois. The Site is located in Sections 10, 11, 14, 15, 22, and 23 Township 3 South, Range 5 West and at latitude 91°27'45" and longitude 39°51'10" (Figure 1). Approximately 250 acres are currently used for the active processing and manufacturing of agricultural chemicals and associated plant support operations. The remaining land is used for flood protection levees and typical agricultural purposes.

The Facility is currently engaged in the manufacturing of agricultural products including herbicides and insecticides. The Facility is currently owned and operated by BASF Corporation; however, Pfizer (formerly Wyeth) and Wyeth Holdings Corporation (jointly Wyeth) retain contractual responsibility for certain historical environmental matters.

1.2 Regulatory History and Background

This Construction Completion Report summarizes the installation of the groundwater extraction and treatment system (the System) and has been prepared to satisfy a requirement contained in the Interim Groundwater Corrective Measures Work Plan (ARCADIS, 2008) which was prepared pursuant to the Hazardous Waste Management Facility Permit (Permit # MOD0226075) issued by the Missouri Department of Natural Resources (MDNR) and the Hazardous and Solid Waste Amendments (HSWA) Permit issued by the U.S. Environmental Protection Agency (USEPA) on April 25, 1990, to the American Cyanamid Company.

A letter from USEPA, dated September 19, 2007, approved the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report (ARCADIS, 2005) and the Phase II RFI (ARCADIS, 2006) and directed Wyeth to prepare a Corrective Measures Study (CMS) Work Plan in accordance with Section III of the Facility's RCRA Hazardous Waste HSWA Permit. However, changes in hydraulic conditions at the Site and plans by BASF to implement new industrial water supply wells in 2008 necessitated the need to install an Interim Groundwater Corrective Measure concurrent with the expansion of the Plant's water supply system.

Several documents were developed and submitted to the MDNR to justify and provide rationale for the implementation of the Interim Groundwater Corrective Measure at the site, including:

- Interim Groundwater Corrective Measure Work Plan, dated June 6, 2008 – presented the treatment system design, system operations, performance monitoring and initial modeling used to locate the extraction wells. (Approved by MDNR in a letter dated July 12, 2008);

- Additional Groundwater Delineation and Capture Zone Modeling Documentation Report, dated January 16, 2009 – presented the results of the additional groundwater sampling and subsequent capture zone modeling that was performed to assess the impacts of the 2008 Mississippi River flooding on the distribution of impacted groundwater beneath the facility. (Approved by MDNR in letter dated February 6, 2009); and

- 90 Percent Design, Interim Groundwater Corrective Measures, dated February 26, 2009 – presented the nearly-complete design package for the groundwater extraction and treatment system. The 90-percent design incorporated an additional recovery well and changes to well locations brought about by a review of the additional groundwater modeling performed in the 4th Quarter of 2008. (Approved by MDNR in letter dated April 7, 2009).

2. Remedial Construction

Construction began on the treatment system on November 30, 2009, with equipment mobilization and project safety briefing for the on-site contractors. Major construction milestones included:

- November 30 to December 7, 2009 – drilled and installed recovery wells.
- December 2009 to April, 2010 – cleared utilities with air knifing, excavated trench and installed piping to recovery wells.
- Late December 2009 to February 2010 – prepared building footings and floor slab.
- February/March 2010 – constructed building lower walls, iron framework, roof, walls, and doors. Building complete by late-March 2010.
- Mid-April, 2010 – treatment equipment delivered to building.
- Late April, 2010 - well vaults formed and poured.
- April/May, 2010 - install treatment system equipment in building.
- May 27, 2010 – system substantially complete – Initial punch list prepared.
- June and July, 2010 – system testing and shakedown operation.
- Late July, 2010 – system placed into operation at half-capacity.
- September 29-30, 2010 – piping modifications performed on the air intake to provide separate air source to each stripper.
- October 20-22, 2010 – piping modifications and pump installation to provide a separate sump discharge pump to each air stripper.
- December, 2010 – installation of granulated activated carbon (GAC) vessels and piping modifications to install header and connect vessels to discharge piping.

- February, 2011 – installation of Inficon gas chromatograph, remote data access, and installation of slip-stream water line to Inficon. Inficon system setup and calibration.

- May, 2011 – evaluation of sequestrant effectiveness, and proposed revisions to address greater than anticipated iron concentrations in the raw water.

Construction photos are presented in Appendix B.

2.1 Site Access and Security

During construction, access to and from the construction zones were restricted to contractors, ARCADIS staff, and BASF plant employees, as needed. The Facility is restricted to plant employees and visitors of the plant. All on-site staff and visitors were noted on the daily construction activities report. Contractors and visitors (if any) were logged by the On-site Safety Officer and were required to sign a visitor's log sheet, which is part of the Site Health and Safety Plan.

Although mobile phones are not allowed at the BASF Facility, the treatment building is located outside of the fenced area, where mobile phones are allowed. A Safety Work Permit was required each morning from BASF.

While the treatment building and active treatment components are predominantly located outside the active and fenced-in portion of the Facility, site security is provided by plant personnel and in-place procedures. The treatment building is locked when not occupied. Vehicle access to the treatment building is via a chained gate crossing the road.

2.2 Site Preparation

Prior to commencing intrusive activities, all well locations, the treatment building locations, and the piping trench locations were discussed and approved by BASF engineering staff. Existing plant utility maps were reviewed to locate any known utilities prior to trenching. In addition, all trenching within the plant boundaries was preceded by air knifing to a depth of 4 ft. to expose any known and unknown plant piping, conduits, or wiring.

Outside the plant fence, air knifing was used to locate and clear known utilities as they were identified from one-call or local utility companies.

2.3 Groundwater Recovery and Treatment System

The groundwater recovery and treatment system was designed and built to extract and treat groundwater impacted by 1,2-dichloroethane (DCA), and monochlorobenzene (MCB) at the Facility. The locations and pumping rates of the recovery wells were identified using computer modeling to provide hydraulic capture of the impacted groundwater under varying river stages, groundwater levels, and plant water well pumping conditions. The initial numerical modeling was presented in the MDNR-approved Interim Groundwater Corrective Measures Work Plan (ARCADIS, 2008). After the 2008 Mississippi River flooding, additional numerical modeling was performed to evaluate the impact of high water levels on the impacted groundwater plume. The flood-impacted groundwater modeling was summarized in the MDNR-approved Additional Groundwater Delineation and Capture Zone Modeling Documentation (ARCADIS, 2009a). Based on an evaluation of the flood-impacted modeling results, an additional recovery well was added to the System, and well locations were moved to optimally achieve capture of the plume. The additional well and revised well locations were reflected in the MDNR-approved 90 Percent Design document (ARCADIS, 2009b).

The as-built groundwater recovery and treatment system layout is shown on Drawings PID1, PID2, and PID2A in Appendix A.

2.3.1 General Processes

The system consists of three recovery wells pumping water to a treatment building, with treated water discharged to a borrow ditch. The sequence of treatment within the system is visually presented in the schematic process flow diagrams (PID1, PID2, and PID3 in Appendix A).

Groundwater is extracted from the aquifer by the extraction wells, and is conveyed via underground piping to the treatment building. At the treatment building, the flow is metered and a dose of sequestrant/chelating chemical is automatically mixed with the raw influent to prevent iron, calcium, and manganese from precipitating out of solution in the form of scale or sludge. The water stream is then split and pumped through two air strippers in parallel. Counter-current air is delivered to each air stripper to volatilize the dissolved phase compounds of concern (COC). Treated water is collected in the effluent sump of each air stripper. The treated water is pumped from the sumps to the GAC vessels for secondary treatment.

The 5,000 lb GAC vessels are operated in a lead-lag fashion to provide initial and polishing treatment. A slip-stream of water is collected from after the first GAC vessel and run through the in-line gas chromatograph for on-Site analysis. The treated effluent is then delivered to the NPDES-permitted point of discharge located in a borrow ditch south of the Facility. Vapor from the air strippers vent through mist eliminators to the atmosphere.

Remote system monitoring is achieved through a cellular modem connected to the programmable logic controller (PLC) that transmits System parameters to the server maintained by the equipment vendor (MLEE). The system can be monitored and operated via remote access. Additionally, operational data, such as pumping rates and air stripper back pressures, is logged and can be accessed via remote monitoring.

The alarm component of the PLC monitors system operation and sends out text messages and emails when alarm conditions occur. In addition, when certain alarm conditions are met, the PLC is designed to shut down the system automatically. Both hard (non-recoverable – system will shut down) and soft (recoverable – system will continue to operate) alarms trigger notification.

2.3.2 System Design Modifications

The system was placed into operation in late-June 2010. After approximately two months of operation at half capacity, carbonate and iron fouling of the air stripper trays was reported which reduced the treatment efficiency of the air strippers. The air stripper trays were cleaned and an evaluation was performed to determine the causes of deterioration of treatment efficiency. The system evaluation resulted in several modifications , including:

- Re-configuring the air intake piping to provide a separate air pathway to each stripper

- Re-configuring the stripper treated water discharge to provide separate stripper sump pumps.

The piping was modified in September and October 2010 to incorporate these revisions to the treatment system.

In order to provide an additional level of polishing treatment prior to discharge to the NPDES outfall, two GAC vessels were installed downstream of the air strippers in December 2010. The GAC vessels operate in series, and a piping header allows flexibility during operation and backwashing.

Additionally, a mobile gas chromatograph (GC) was installed at the treatment building to provide additional confirmation that treatment levels are being achieved. A low-flow slip stream of water is extraction from the treatment discharge piping after the lead GAC vessel and prior to the second GAC vessel. The slip-stream water is analyzed hourly by the GC for the NPDES constituents (except for 1,1,2-Trichloroethane, which is not on the standard Inficon method list). The GC is configured to send an alarm to the PLC if concentrations of NPDES parameters are reported above pre-set levels. The pre-set levels that trigger alarms are generally one-half to one-tenth the NPDES-permitted levels.

2.3.3 Treatment Building

The treatment equipment is housed in a 30 ft by 30 ft pre-engineered treatment building, which includes the following features:

- Dual garage door-style roll-up openings that accommodate equipment delivery and maintenance of the shallow tray strippers
- Industrial concrete flooring with integral spill containment around the building perimeter
- Floor sump with high level switch. Any water that accumulates in the sump is processed through the air stripper.
- Thermostatically-controlled electrical convection heaters
- Incandescent lighting with vapor tight globe and wall switch

2.3.4 Recovery Wells and Piping

The three extraction wells are designed to pump at flow rates of 40 to 60 gallons per minute (gpm) each. The target operational flow rates, based on modeling simulations, include:

- RW-1 (south well) – 60 gpm
- RW-2 (north well) – 50 gpm
- RW-3 (west well) – 40 gpm

The wellhead and local discharge piping are installed in below-grade pre-cast concrete access vaults. The access vaults have locked, flush-mounted, watertight, and hinged access lids. A shut off valve and pressure gauge are located in the discharge piping within each wellhead access vault. Power wiring is routed to an electrical disconnect junction box above the well vault. The piping within each well and the wellhead access vault is galvanized carbon steel which transitions to high-density polyethylene (HDPE) double-wall piping within the access vault. Well completion diagrams for the three recovery wells are included in Appendix D.

Conveyance piping is constructed of double-walled high-density polyethylene (HDPE) pipe (2-inch diameter for the inner piping and 4-inch diameter for the secondary containment piping) from the extraction well vaults to the treatment building. The conveyance piping transitions to single-walled piping in the treatment building. A single-walled 1-inch recirculation line from the treatment building to each well is included. This recirculation line will be used during piping maintenance to remove scaling in the conveyance piping if pressure losses interfere with system operation. The treated water discharge piping to the outfall is single-walled.

2.3.5 Process Equipment

The following sections provide a brief overview of the major components of the treatment system.

2.3.5.1 Groundwater Recovery Pumps

The groundwater recovery pumps are conventional, submersible multi-stage water well-type pumps. The electrical pump motors use 230V, 1-phase electrical service. The pumps are located near the top of each well's screened interval, with the intake at approximately 40 ft below ground surface (bgs).

Flow rate adjustments can be made by a manual throttling valve located downstream of the flow meter in the treatment building. Pressure gauges are installed at the well head and in the treatment building to monitor conveyance pipeline loss.

2.3.5.2 Air Stripper and Blowers

The air stripping equipment consists of two shallow tray air strippers (QED EZ-tray model 24.6). Each stripper has six trays that can be removed for cleaning. The strippers are made of stainless steel, with a footprint of 6 ft deep by 5 ft wide and 9 ft tall.

A piping manifold combines the flow from the three recovery wells, and then splits the combined flow, directing half the raw influent to each stripper. Following treatment, the water from each stripper sump is combined and passes through post-stripper bag filters before passing through the GAC treatment vessels for final treatment.

2.3.5.3 Sequestering Agent

Mineral sequestering treatment is implemented to prevent minerals, such as iron, manganese, or hardness from adversely impacting the operation of the System. Mineral precipitation is minimized by injecting a chemical additive to the combined raw influent prior to the air stripping treatment. Two separate sequestrant formulations are used: one sequestrant to address carbonate scaling and a second formation to address iron in the raw water. The selected sequestrants are delivered to the site in 55-gallon drums are mixed with water (to reduce viscosity) in sequestrant storage totes. Chemical feed pumps deliver the sequestrant agents into the raw water line at the desired feed dosages.

As described in the Interim Measures Work Plan (ARCADIS, 2008) the effectiveness of the sequestrant was evaluated after initial operation. After the System had been operating for several months, the influent concentration of iron increased dramatically, and a sequestrant evaluation was performed to respond to the changed conditions. The types and dosages of sequestrant were revised to disperse the iron and maintain System operation. The impact of the observed influent iron concentration on System operations will be evaluated regularly as part of the System operation and maintenance (O&M) activities.

2.3.5.4 Liquid Phase Granular Activated Carbon Units

Two steel GAC vessels, each containing 5,000 lbs of activated carbon, have been installed at the treatment building. Water from the air stripper sumps are directed through bag filters prior to entering the GAC vessels. The GAC vessels are arranged

in a 'lead-lag' arrangement, with the combined effluent flow passing through each vessel in series.

The GAC vessels are constructed of carbon steel, 6 ft diameter, approximately 10 ft tall, and have a volume of 1,326 gallons each. The carbon is virgin grade, coconut hull liquid phase carbon (8 x 30 mesh).

2.3.5.5 In-line Gas Chromatograph

An Inficon model CMS5000 in-line Gas Chromatograph was installed in early 2011. The CMS5000 Monitoring System is a self-contained system utilizing GC technology for continuous, unattended remote monitoring and analysis of water. During operation, a continuous slip-stream of water is provided to the system, and a grab sample is picked off the slip-stream approximately hourly. Water samples are analyzed for the primary NPDES parameters, and results stored in the on-site database for subsequent review. Alarm points are set for the parameters and an alarm signal is sent to the treatment system PLC and subsequently transmitted to the operators via text messaging and email. The pumping and treatment system will shut down operation if the In-line gas chromatograph senses water concentration above the alarm set points.

2.3.5.6 Clean-in-Place System

The System was constructed with 1-inch diameter recirculation lines extending from the treatment building to each extraction well, as well as acid circulation piping within the treatment building to the air strippers. Unicid acid (or equivalent) will be delivered in granular or powder form and introduced to the 500-gallon clean-in-place tank. The clean-in-place pump is used to convey cleaning water to the wells, treatment system piping, and air strippers.

2.4 Utility Service

Electrical service to the Site was obtained through the construction of new power feed line from an electrical substation located approximately one mile north of the treatment building. Overhead lines convey power from the substation to a utility pole approximately 600 ft south of the treatment building. Power is transferred via underground conduit from the utility pole to a transformer located on the west side of the treatment building. A 480 volt, three phase, 45KVA electrical service was installed to satisfy the power requirements of the groundwater recovery and treatment system.

A power disconnect is located at the main power panel in the building in case of emergency.

Water service is provided by Marion County Public Water. A water distribution line exists approximately 200 feet south of the treatment building. A water meter was installed at this location and the water service placed in the RW-1 piping trench to the building.

The system PLC and Inficon gas chromatograph PC connection use cellular data service to transmit information for the remote telemetry control/monitoring and analytical data acquisition.

2.5 Site Grading and Cover

Upon completing all site-related construction activities, the area surrounding the treatment building was graded and gravel placed to prevent erosion and match pre-construction conditions. Areas disturbed by the installation of piping were graded to match the existing ground surface and graveled where appropriate. Several paved areas that were disturbed during construction were patched with asphalt. The well vault areas were graded to achieve drainage, and covered with gravel to prevent erosion.

2.6 As-Built Survey

As specified in the Interim Groundwater Corrective Measures Work Plan (ARCADIS, 2008), a professional engineer was employed to survey the 'as-built' locations of the treatment building, recovery well locations, piping cleanout and electrical pull box locations, trench locations, and locations of other major system components. The northing and easting coordinates are tied-into the original plant coordinate system, consistent with previously installed monitoring wells at the site. The as-built survey is presented in Appendix C.

3. Operating Permit

A Missouri State Operating Permit, permit number MO-0135765, was obtained to discharge treated effluent from the extraction and treatment system. The operating permit was issued in compliance with the Missouri Clean Water Law (Chapter 644 R.S. MO) and the Federal Water Pollution Control Act, and sets effluent limits and monitoring requirements for the extraction and treatment system.

The single outfall (001) is located at a borrow ditch approximately 800 ft southwest of the treatment building.

4. References

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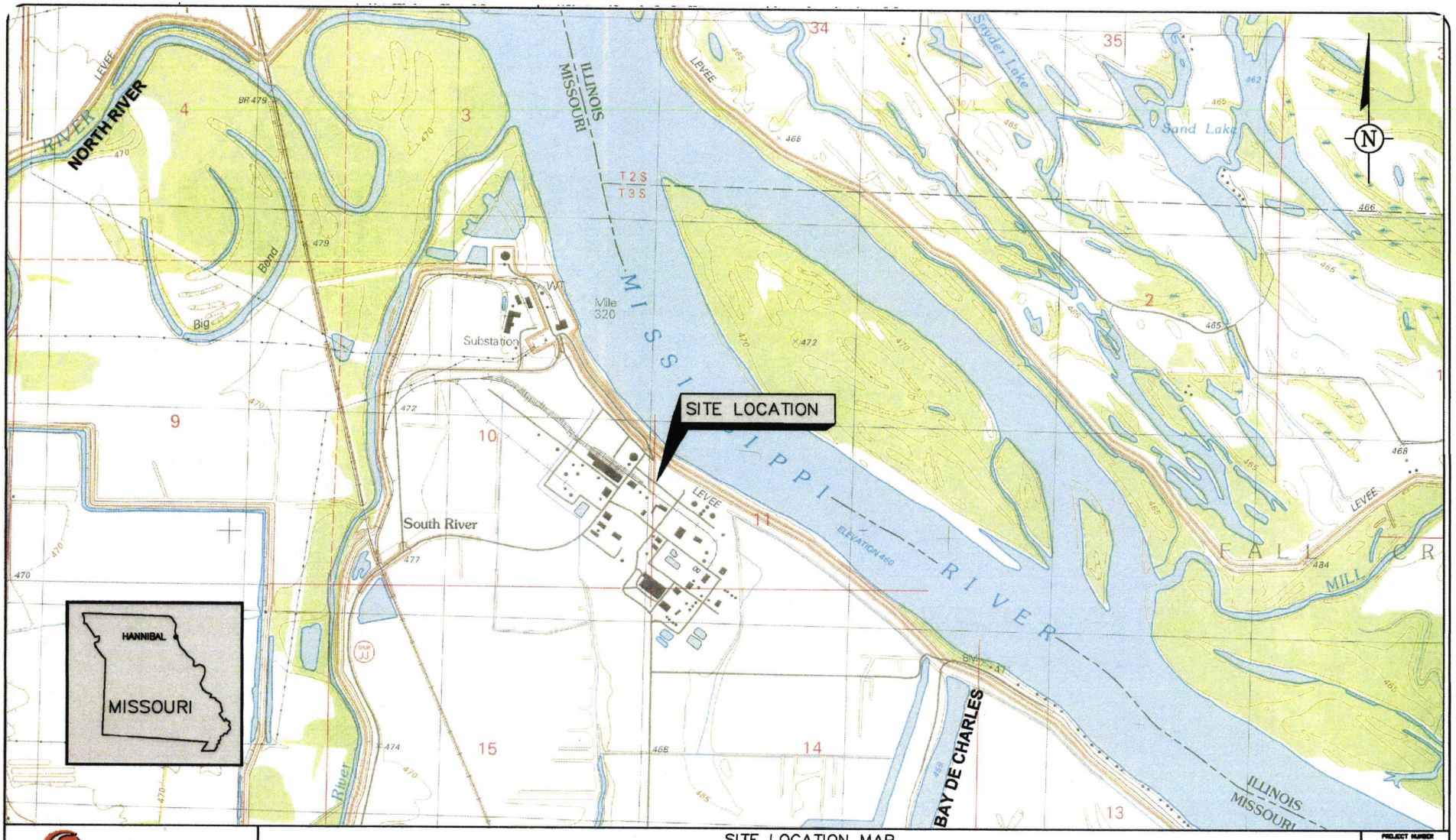
Figures



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SITE LOCATION MAP

0 1500 FT.

FORMER AMERICAN CYANAMID COMPANY
AGRICULTURAL PRODUCTS FACILITY
HANNIBAL, MISSOURI

PROJECT NUMBER
KC001475.0001

FIGURE NUMBER
1

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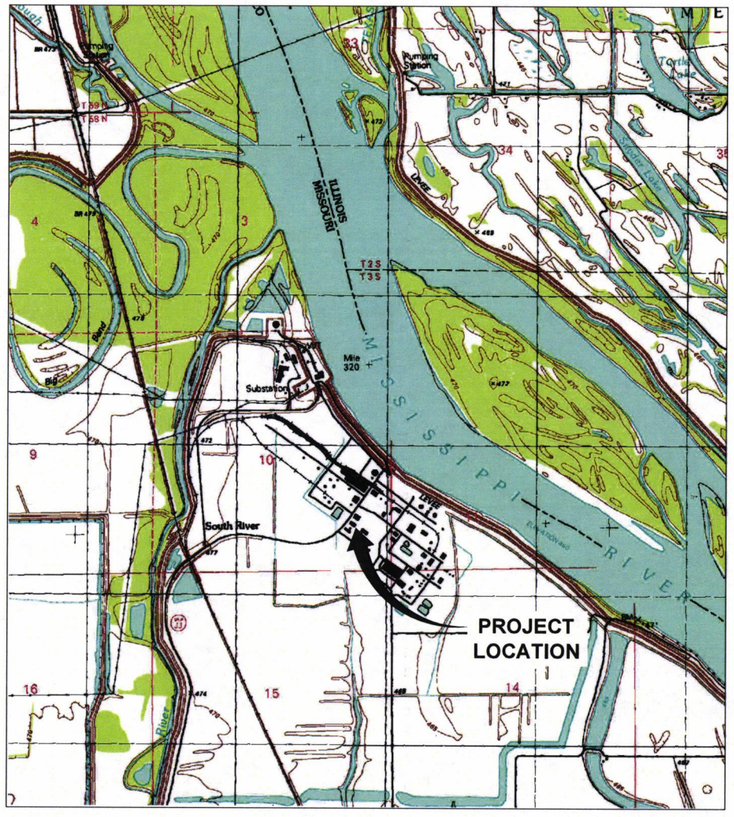
Appendix **A**

Record Drawings

RECORD DRAWINGS

WYETH GROUNDWATER TREATMENT SYSTEM



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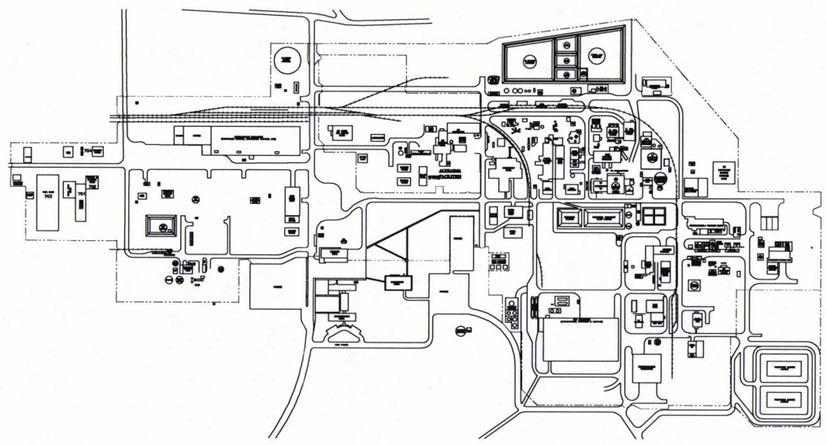

DATE ISSUED
MAY 2011

WYETH HOLDINGS CORPORATION
HANNIBAL, MISSOURI

ARCADIS

ARCADIS U.S., INC.

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3120 HIGHWAY W
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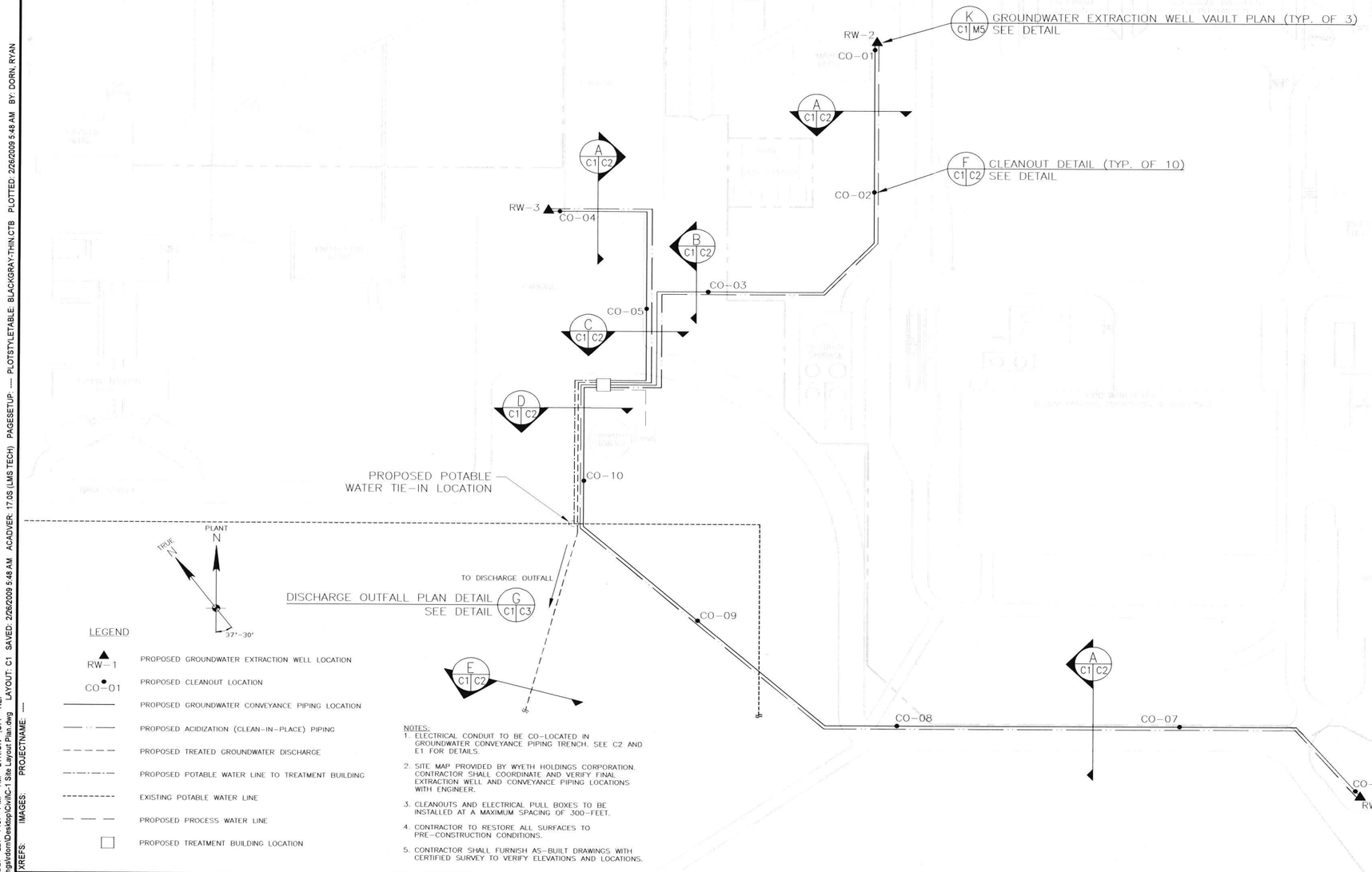
(573) 221-4048
CONTACT: KEVIN BOCK

INDEX TO DRAWINGS



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USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
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Professional Engineer's Name
ROYCE FACE
Professional Engineer's No.
(PE NUM)

State	Date Signed	Project Mgr.
MO		BO
Designed by	Drawn by	Checked by
RD	RD	JF

ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

SITE LAYOUT PLAN

CIVIL

ARCADIS Project No.
KC001566.0001.0150

Date
FEBRUARY 26, 2009

ARCADIS U.S., INC.
6725 ROSEHILL
SUITE 350
LENEXA, KANSAS
TEL. 913.492.0900

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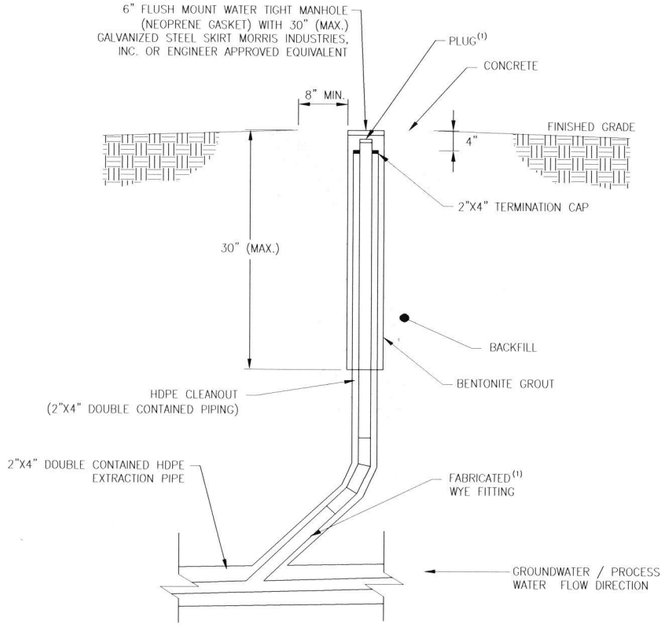

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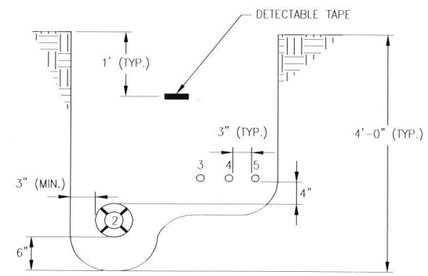

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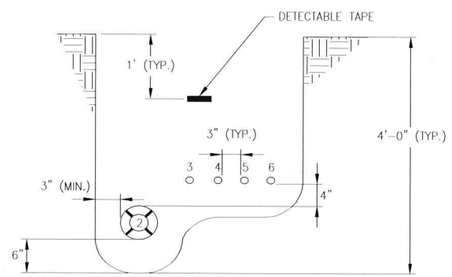

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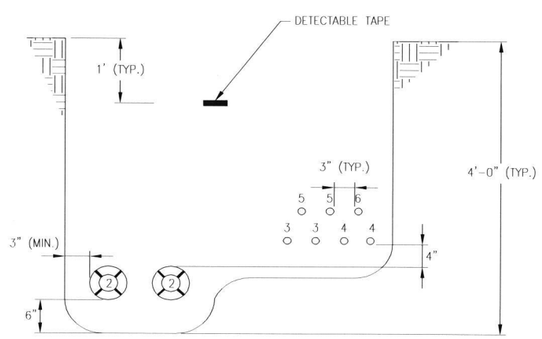

C C1 C2 TRENCH SECTION C
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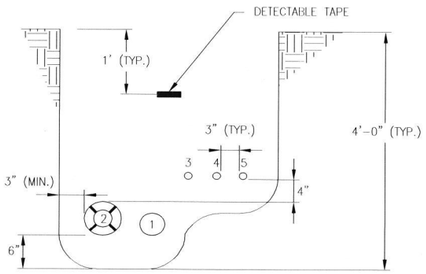

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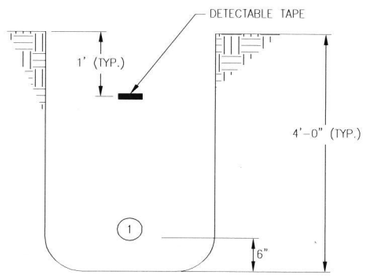

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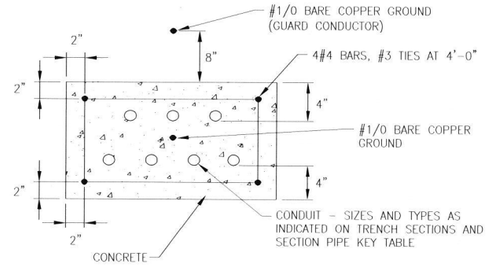
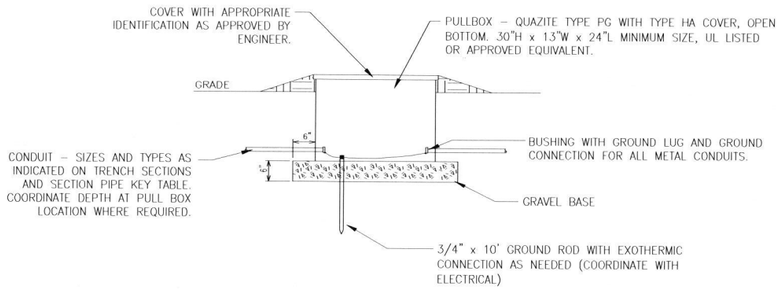


L C2 C2 CONCRETE ENCASED CONDUIT DETAIL
NOT TO SCALE



K E1 C2 ELECTRICAL PULL BOX DETAIL (TYP. OF 7)
NOT TO SCALE

NOTES:
1. A 3" WIDE DETECTABLE TAPE SHALL BE INSTALLED 1' MINIMUM BELOW FINISHED GRADE ABOVE THE PROCESS PIPELINES. USE BLUE TAPE CENTERED ABOVE THE FORCEMAINS AND LABELED "CAUTION BURIED PIPELINES BELOW".
2. CONTRACTOR TO COORDINATE TRENCHING AND INSTALLATION OF PIPE.
3. CONTRACTOR TO RESTORE ALL SURFACES TO PRE-CONSTRUCTION CONDITIONS.
4. ALL PIPING SHALL BE INSTALLED IN PIPE BEDDING THAT MEETS THE FOLLOWING REQUIREMENTS: NATURAL RIVER OR BANK, CRUSHED, OR CONGLOMERATE GRANULAR; FREE OF SILT, CLAY, LOAM, FRIABLE OR SOLUBLE MATERIALS, AND ORGANIC MATTER; GRADED IN ACCORDANCE WITH ASTM D2487 GROUP SYMBOL SP; WITHIN THE FOLLOWING LIMITS:
   3/8 INCH SIEVE SIZE - 100 PERCENT PASSING
   NO.100 SIEVE SIZE - 0 TO 15 PERCENT PASSING.
5. THE REMAINDER OF THE TRENCH SHALL BE BACKFILLED WITH NATIVE MATERIAL, COMPACTED TO 95 PERCENT OF ITS MAXIMUM DRY DENSITY.
6. ELECTRICAL CONDUIT IN TRENCH TO BE ENCASED IN CONCRETE. SEE DETAIL L C2 C2

TRENCH CROSS SECTION PIPE KEY

PIPE ID	SIZE	MAT'L	COMMENT
1	3"	HDPE	TREATED GROUNDWATER LINE
2	2"X4"	HDPE	DOUBLE CONTAINED GROUNDWATER EXTRACTION LINE
3	1"	HDPE	ACIDIZATION (CLEAN-IN-PLACE) LINE
4	1-1/4"	PVC	INSTRUMENTS AND CONTROL CONDUIT
5	1-1/4"	PVC	ELECTRICAL POWER CONDUIT
6	TBD	TBD	MAIN ELECTRICAL POWER CONDUIT

CITY: DIVGROUP: DB: LD: PIC: PM: TM: LYR:ON=*;OFF=*REF* C:\Documents and Settings\dorn\Desktop\Civil\C-2 Piping and Trenching Details.dwg LAYOUT: C2 SAVED: 2/25/2009 8:54 AM ACADVER: 17.0S (LMS TECH) PAGESETUP: ---
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SCALE(S) AS INDICATED

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No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	RD	JF

Professional Engineer's Name: ROYCE FACE
Professional Engineer's No. (PE NUM)
State: MO | Date Signed: | Project Mgr.: BO
Designed by: RD | Drawn by: RD | Checked by: JF

ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

PIPING AND TRENCHING DETAILS

CIVIL

ARCADIS Project No. KC001566.0001.0150
Date FEBRUARY 26, 2009

ARCADIS U.S., INC.
8725 ROSEHILL
SUITE 350
LENEXA, KANSAS
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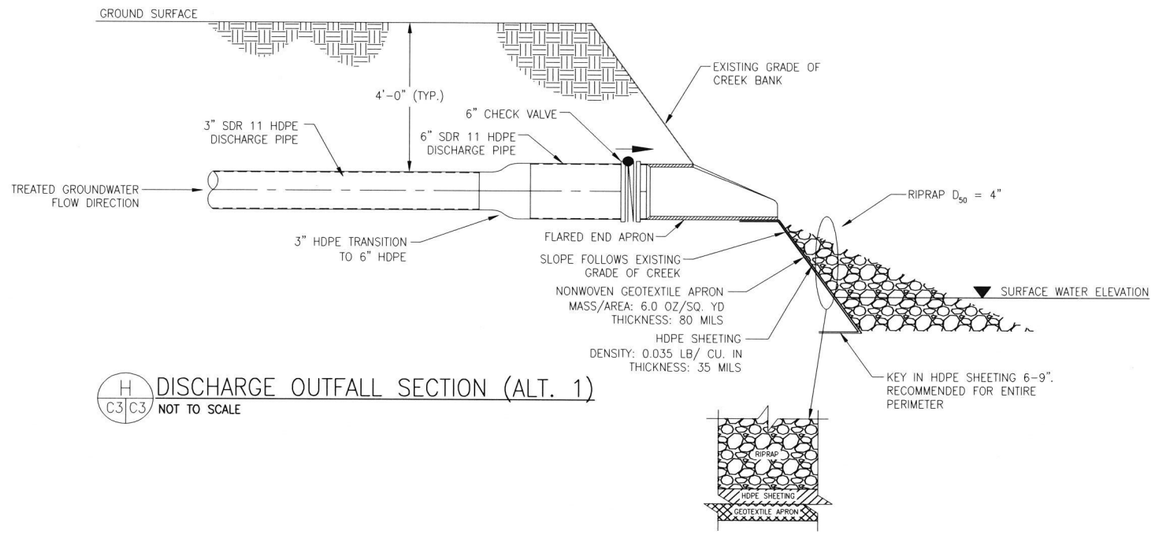
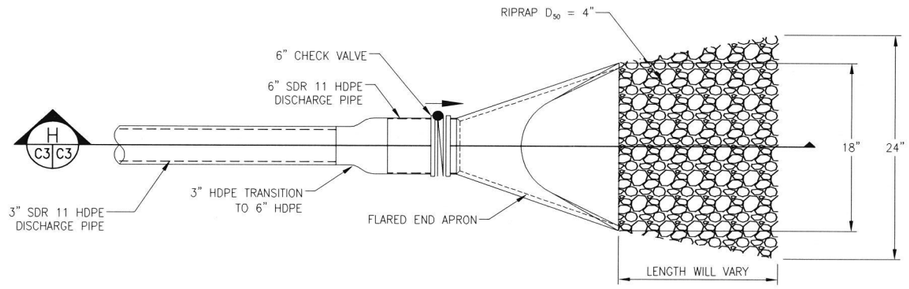
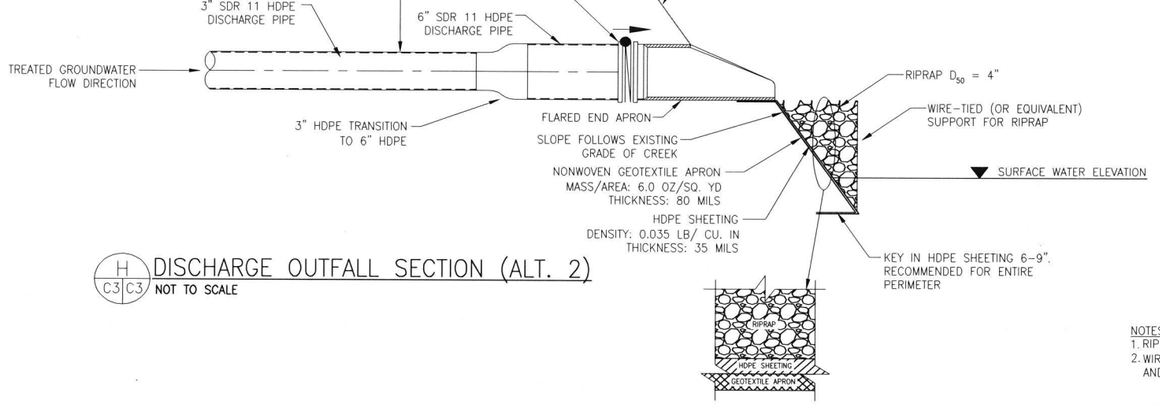
C2



H / C3|C3 DISCHARGE OUTFALL SECTION (ALT. 1)
NOT TO SCALE



G / C1|C3 DISCHARGE OUTFALL PLAN DETAIL
NOT TO SCALE



H / C3|C3 DISCHARGE OUTFALL SECTION (ALT. 2)
NOT TO SCALE

NOTES:
1. RIPRAP APRON LENGTH WILL VARY BASED ON WATER LEVEL AT TIME OF INSTALLATION.
2. WIRE-TIED RIPRAP (OR EQUIVALENT) MAY BE REQUIRED BASED ON SLOPE OF CREEK BED AND TYPICAL SURFACE WATER ELEVATION.

CITY: DIV/GROUP: DB: LD: PIC: PM: TM: LYR:ON=*;OFF=*REF* C:\Documents and Settings\rdorn\Desktop\Civil\C-3 Outfall Discharge Detail.dwg LAYOUT: C3 SAVED: 2/26/2009 7:57 AM ACADVER: 17.0S (LMS TECH) PAGESETUP — PLOTSTYLETABLE: BLACKGRAY.CTB PLOTTED: 2/26/2009 7:57 AM BY: DORN, RYAN
XREFS: IMAGES: PROJECTNAME: —

SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	RD	JF

Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)
State: MO | Date Signed: | Project Mgr.: BO
Designed by: RD | Drawn by: RD | Checked by: JF

ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

DISCHARGE OUTFALL DETAILS

CIVIL

ARCADIS Project No. KC001566.0001.0150
Date FEBRUARY 26, 2009
ARCADIS U.S., INC.
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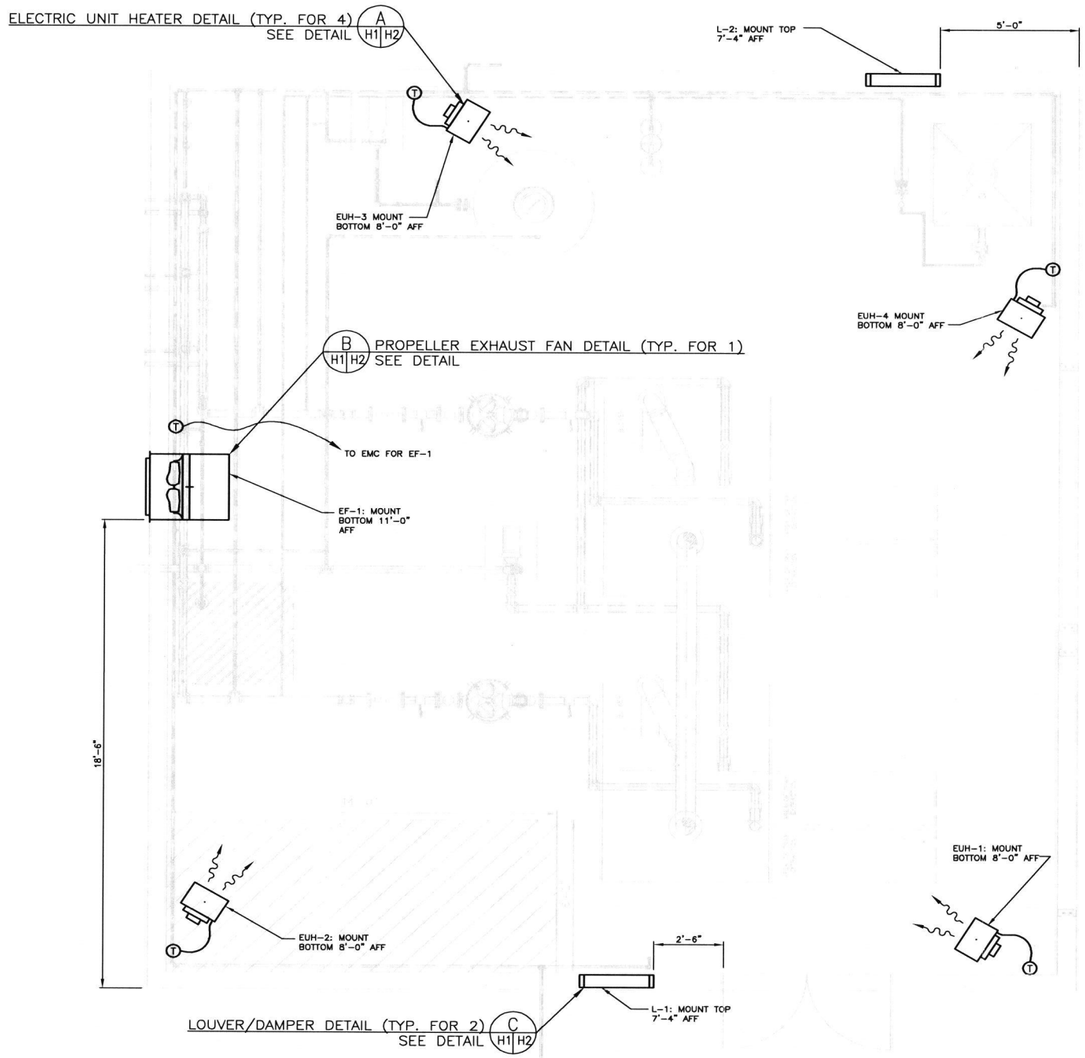
C3



TREATMENT BUILDING HVAC PLAN

SCALE: 3/8"=1'-0"

HVAC LEGEND

EF	EXHAUST FAN
EUH	ELECTRIC UNIT HEATER
L	LOUVER
(T)	THERMOSTAT

GENERAL/HVAC NOTES

1. DO NOT SCALE DRAWINGS. THE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATE THE APPROXIMATE LOCATION OF HVAC EQUIPMENT. THE CONTRACTOR SHALL COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS AND DELAYS. MINOR OFFSETS AND ADJUSTMENTS SHALL BE PROVIED WHERE REQUIRED AT NO ADDITIONAL COST TO THE OWNER. DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

2. WHEREVER THE WORD "PROVIDE" IS USED, IT SHALL MEAN "FURNISH AND INSTALL COMPLETE AND READY FOR USE."

3. THERMOSTATS SHALL BE LOCATED 48" AFF UNLESS OTHERWISE NOTED. ALL CONDUIT, ROUGH IN ELECTRICAL BOXES AND WIRING, EXCLUDING LOW VOLTAGE CONTROL WIRING, SHALL BE INCUDED UNDER THE ELECTRICAL SECTION OF THE CONTRACT DOCUMENTS. COORDINATE REQUIREMENTS AND ROUGH IN LOCATION FOR ALL CONTROL DEVICES, ELECTRICAL CONNECTIONS TO EQUIPMENT, AND SWITCH LOCATION. CONTROL WIRING SHALL BE PROVIDED AND INSTALLED UNDER THE HVAC SECTION OF THE CONTRACT DOCUMENTS.

4. INSTALL ALL HVAC EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODE REQUIREMENTS AND REGULATIONS. ALL EQUIPMENT IS TO BE INSTALLED WITH MANUFACTURER'S RECOMMENDED CLEARANCES AND REQUIRED ACCESS.

5. PROVIDE A MINIMUM OF 10' CLEARANCE BETWEEN FRESH AIR INTAKES AND EXHAUST OUTLETS.

6. ALL OF THE COSTS ASSOCIATED WITH PROVIDING TEMPORARY HEATING AND VENTILATION SHALL BE BORNE SOLELY BY THE CONTRACTOR, INCLUDING BUT NOT LIMITED TO POWER CONSUMPTION AND EQUIPMENT CLEANING.

7. COORDINATE CONSTRUCTION OF ALL HVAC WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE ALL EQUIPMENT ELECTRICAL CHARACTERISTICS WITH THE ELECTRICAL SERVICE AND THE ELECTRICAL CONTRACTOR. THE SCOPE OF THIS COORDINATION IS, BUT NOT LIMITED TO: CORDINATE VOLTAGE, PHASE, AMP CAPACITY, WIRE SIZE, CONDUIT SIZE AND LOCATION, DISCONNECT SIZE AND LOCATION, FUSE SIZE, ETC. OF ALL EQUIPMENT. IN THE EVENT OF A CONFLICT, THE HVAC CONTRACTOR IS TO NOTIFY THE ENGINEER PRIOR TO HVAC AND ELECTRICAL EQUIPMENT BEING ORDERED. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE.

8. THE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, CONTROL SYSTEMS, DEVICES, PERMITS AND SERVICES NECESSARY FOR FURNISHING AND INSTALLING A COMPLETE OPERABLE HVAC SYSTEM AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.

9. ALL CUTTING, PATCHING, STRUCTURAL STEEL, WEATHER PROOFING, PAINTING, AND WALL OPENINGS REQUIRED FOR THE INSTALLATION OF HVAC WORK, SHALL BE PROVIDED BY THE CONTRACTOR AT NO COST TO THE OWNER. AND BE COORDINATED WITH THE OTHER TRADES INVOLVED.

10. PROVIDE VIBRATION ISOLTATORS ON ALL HVAC EQUIPMENT. IF NOT SPECIFICALLY CALLED OUT, PROVIDE AS RECOMMENDED BY MANUFACTURER FOR QUIET OPERATION AND TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.

11. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO BIDDING, ORDERING, FABRICATION OR INSTALLATION OF MATERIALS OR EQUIPMENT.

12. TESTING, ADJUSTING, AND BALANCING CONTRACTOR SHALL BALANCE EXHAUST FAN AIRFLOW AS INDICATED ON THE DRAWINGS. FAILURE TO NOTIFY HVAC ENGINEER OF DEFICIENCIES PRIOR TO COMPLETION OF TESTING, ADJUSTING, AND BALANCING WORK SHALL PLACE BURDEN OF ANY NECESSARY RETESTING COSTS WITH THE CONTRACTOR. SUBMIT TESTING, ADJUSTING, AND BALANCING REPORT TO THE HVAC ENGINEER FOR APPROVAL PRIOR TO BUILDING OCCUPANCY.

13. GENERAL CONTRACTOR TO COORDINATE ALL DISCIPLINES. AFTER SHOP DRAWINGS ARE APPROVED AND PRIOR TO START OF WORK.

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING. USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	BL	JF

Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)
State: MO | Date Signed: | Project Mgr.: BO
Designed by: BL | Drawn by: BL | Checked by: JF

ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

TREATMENT BUILDING HVAC PLANS, LEGEND & NOTES

HVAC

ARCADIS Project No. KC001566.0001.0150
Date FEBRUARY 26, 2009

ARCADIS U.S., INC.
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H1

ELECTRIC UNIT HEATER SCHEDULE										
MARK	TYPE	MAKE	MODEL	HEAT OUTPUT (KW)	AIRFLOW (CFM)	MOTOR (HP)	THROW (FT)	TEMPERATURE RISE (DEGREE F)	ELECTRICAL (V/PH/HZ)	REMARKS
EUH-1	CORROSION RESISTANT	CHROMALOX	HD3D-750	7.5	590	1/15	13	37	480/3/60	1,2
EUH-2	CORROSION RESISTANT	CHROMALOX	HD3D-750	7.5	590	1/15	13	37	480/3/60	1,2
EUH-3	CORROSION RESISTANT	CHROMALOX	HD3D-750	7.5	590	1/15	13	37	480/3/60	1,2
EUH-4	CORROSION RESISTANT	CHROMALOX	HD3D-750	7.5	590	1/15	13	37	480/3/60	1,2

REMARKS:

1. SWIVEL MOUNTING BRACKET.
2. CORROSION RESISTANT THERMOSTAT CHROMALOX MODEL WCRT-100.

LOUVER SCHEDULE								
MARK	TYPE	MAKE	MODEL	AIRFLOW (CFM)	MODULAR OPENING (IN. X IN.)	FREE AREA (SQFT)	FINISH	REMARKS
L-1	MOTORIZED W/DAMPER	RUSKIN	ELC6375DAX	2500	32 X 40	3.58	KYNAR/FLUOROPOLYMER	1,2,3,4,5
L-2	MOTORIZED W/DAMPER	RUSKIN	ELC6375DAX	2500	32 X 40	3.58	KYNAR/FLUOROPOLYMER	1,2,3,4,5

REMARKS:

1. BIRDSCREEN MOUNTED ON EXTERIOR.
2. INSECT SCREEN MOUNTED ON INTERIOR.
3. CORROSION RESISTANT FINISH ON ENTIRE LOUVER AND BIRDSCREEN, COLOR SELECTED BY OWNER.
4. SPRING RETURN MOTOR OPERATOR, 120/1/60, FOOT-MOUNTED, NON-DIRECT COUPLED TYPE, HONEYWELL MODEL M4185 OR APPROVED EQUAL.
5. INTERLOCKED WITH EXHAUST FAN.

FAN SCHEDULE										
MARK	TYPE	MAKE	MODEL	AIRFLOW (CFM)	E.S.P. (IN. W.C)	MOTOR (HP)	ELECTRICAL (V/PH/HZ)	TYPE DRIVE	DAMPER	REMARKS
EF-1	PACKAGED PROPELLER	LOREN COOK	24XMP	5000	0.25	3/4	480/3/60	BELT	GRAVITY	1,2,3

REMARKS:

1. EISENHEISS OR PHENOLIC EPOXY CORROSION RESISTANT TYPE FINISH.
2. NEMA 3R, PRE-WIRED, INTEGRAL DISCONNECT SWITCH.
3. GRAVITY TYPE BACKDRAFT DAMPER.

HVAC SPECIFICATIONS

EUH: HORIZONTAL PROJECTION FAN-COIL UNIT WITH ALL METAL PARTS INCLUDING FAN; FABRICATED WITH STAINLESS STEEL OR COATED WITH A CORROSION-RESISTANT PAINT. MONEL, STEEL SHEATH, FIN HEATING ELEMENTS WITH AUTOMATIC RESET THERMAL OVERHEAT PROTECTION. ADJUSTABLE DISCHARGE LOUVERS. PROVIDE UNITS WITH HEAVY WIRE REAR PROTECTION GRILL, STAINLESS STEEL HARDWARE AND MOUNTING BRACKETS FOR CEILING OR WALL INSTALLATION. EPOXY PAINTED MOTORS, TOTALLY ENCLOSED FOR CONTINUOUS, HEAVY DUTY OPERATION, AND EQUIPPED WITH BUILT-IN THERMAL OVERLOAD PROTECTION. TWO-POLE HEATNG CONTACTOR WITH COIL AND CONTROL TRANSFORMER FUSED ON ALL LEADS. PROVIDE REMOTE WALL MOUNTED THERMOSTAT WITH A RANGE OF 40-100 DEGREES F, CORROSION RESISTANT NEMA 4X CONSTRUCTION

EF: PACKAGED PROPELLER WALL, FABRICATED STEEL WITH BLADES SECURELY FASTENED TO HUB, STATICALLY AND DYNAMICALLY BALANCED, HUB KEYED AND LOCKED TO SHAFT UTILIZING SET SCREWS, DIRECTLY CONNECTED TO MOTOR OR PROVIDED WITH V-BELT DRIVE. MOTOR, SELF ALIGNING, PRE-LUBRICATED BALL OR SLEEVE BEARINGS AFFIXED TO MOUNTING PLATE PERMITTING BELT TENSIONING, NEOPRENE VIBRATION ISOLATION BETWEEN FAN ASSEMBLY AND MOUNTING PLATE. ONE PIECE FRAME, SQUARE STEEL WITH DIE-FORMED VENTURI ORIFICE, MOUNTING FLANGES AND SUPPORTS, WITH EISENHEISS OR PHENOLIC EPOXY CORROSION RESISTANT FINISH, MULTIPLE BLADE BACKDRAFT DAMPER WITH OFFSET HINGE PIN, BLADES LINKED. RECTANGULAR, GALVANIZED STEEL FRAME TO FIT THROUGH WALL WITH INTEGRAL SHUTTER, SCREEN GUARD ON MOTOR SIDE, AND ADJUSTABLE ANCHOR ANGLE WHICH ADJUSTS TO THE THICKNESS OF THE WALL FOR EASE OF INSTALLATION.

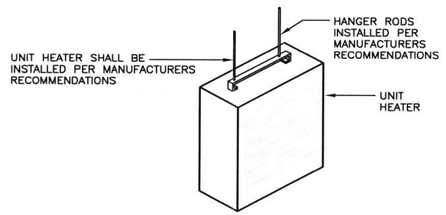
L: LOUVER CONSISTS OF A FIXED BLADE EXTERIOR, INTEGRAL MOTORIZED DAMPER, AND A WATER COLLECTING SYSTEM FOR DRAINAGE. EXTRUDED ALUMNIUM CONSTRUCTION WITH ADJUSTABLE BLADES, JAMBS, HEAD AND SILL MEMBERS FABRICATED FROM A MINIMUM 8 GAGE AND FIXED BLADES OF 12 GAGE 6063T5 ALUMINUM ALLOY. OPERATING BLADES NOT VISIBLE WHEN OPEN AND DRAIN TO THE EXTERIOR. SPACE BLADES 5-1/2 INCHES ON CENTER, NYLON BEARINGS, REPLACEABLE VINYL EDGE GASKETS, SPONGE NEOPRENE OR COMPRESSIBLE ALUMINUM JAMB GASKETS. LOUVER SHALL BE AMCA RATED AT ZERO WATER PENETRATION WITH THE SPECIFIED AIR FLOWS AND FOR AIR LEAKAGE OF LESS THAN 4.0 CFM PER SQUARE FOOT OF FACE AREA AT A WIND VELOCITY OF 30 MPH (0.44 INCH W.C. PRESSURE) WITH DAMPER BLADES CLOSED. MINIMUM 14 GAGE ALUMINUM, 1/2 INCH SQUARE MESH BIRD SCREENS MOUNTED IN ALUMINUM FRAMES. 10 MESH ALUMINUM WIRE INSECT SCREENS MOUNTED IN ALUMINUM FRAMES. LOUVER DESIGN SHALL ALLOW SCREENS TO BE REMOVABLE AND MOUNTED ON THE FACE OF LOUVERS WITHOUT INTERFERING WITH LOUVER, DAMPER, AND DRIVE FUNCTION. FREE AREAS OF LOUVERS SHALL BE SUFFICIENT FOR INTENDED AIR FLOWS WITHOUT WATER PENETRATION. CONSTRUCT LOUVERS WHICH EXCEED MANUFACTURER'S INSTRUCTED WIDTH OR HEIGHT IN MULTIPLE SECTIONS, CONNECTED BY HIDDEN MULLIONS. FABRICATE MULLIONS OF SAME MATERIAL AS LOUVER WITH SAME FINISH. PROVIDE EXTENDED SILLS AND STOOLS FOR EASE OF MOUNTING WHERE INDICATED ON THE DRAWINGS.

T: CORROSION RESISTANT EXHAUST FAN THERMOSTAT NEMA 4X, LINE VOLTAGE TYPE RATED FOR 16 AMPERES AT 120 VAC WITH EXTERNAL SET POINT ADJUSTMENT. CHROMALOX WCRT-100, HONEYWELL T631F, OR AS APPROVED.

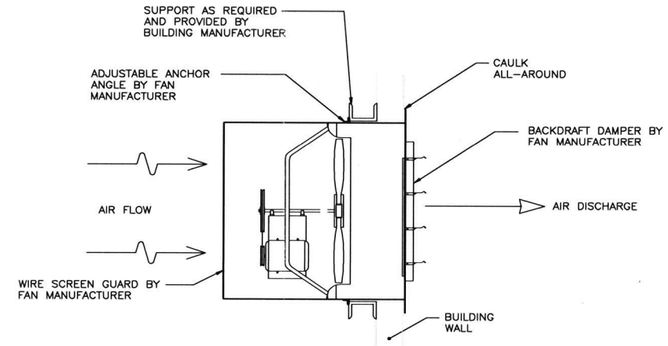
HVAC OPERATIONAL DESCRIPTIONS

EUH-1: SINGLE TEMPERATURE, WALL MOUNTED THERMOSTAT MAINTAINS SPACE TEMPERATURE BY CYCLING UNIT HEATING CONTROLS.

EF-1/L-1 & L-2: CONTROL EXHAUST FAN EF-1 BY A HAND-OFF-AUTO SWITCH. IN THE HAND POSITION, EF-1 MOTOR IS ACTIVATED. IN THE AUTO POSITION, SINGLE TEMPERATURE, WALL-MOUNTED, THERMOSTAT SHALL CYCLE THE FAN MOTOR. MOTORIZED AIR INTAKE LOUVERS L-1 & L-2 THAT PROVIDE MAKE-UP AIR FOR EXHAUST FAN EF-1, OPEN THE LOUVERS WHENEVER THE EXHAUST FAN IS ACTIVATED.



A H1|H2 ELECTRIC UNIT HEATER DETAIL (TYP. FOR 4)
NOT TO SCALE



B H1|H2 PROPELLER EXHAUST FAN DETAIL (TYP. FOR 1)
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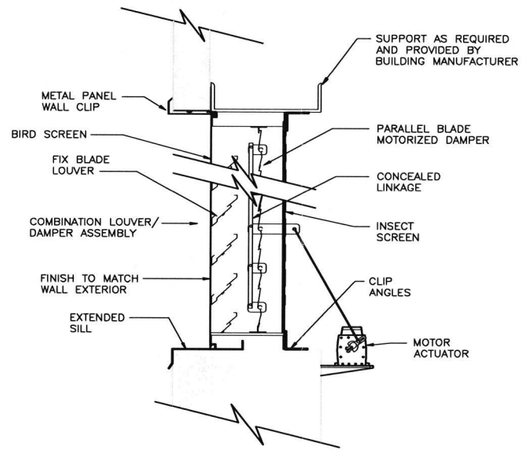

NOTES:
1. LOUVER/DAMPER ASSEMBLIES TO BE ASSEMBLED AT LOUVER MANUFACTURER FACTORY.
2. CLIP ANGLES AND EXTENDED SILL TO BE PROVIDED BY LOUVER MANUFACTURER.
3. MOTOR ACTUATORS TO BE SIZED BY LOUVER MANUFACTURER.
4. INSTALLATION OF LOUVER TO BE IN ACCORDANCE WITH LOUVER MANUFACTURER'S RECOMMENDATIONS.

C H1|H2 LOUVER/DAMPER DETAIL (TYP. FOR 2)
NOT TO SCALE

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XREFS: IMAGES: PROJECTNAME: ---

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No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	BL	JF

Professional Engineer's Name
ROYCE FACE
Professional Engineer's No.
(PE NUM)

State	Date Signed	Project Mgr.
MO		BO
Designed by	Drawn by	Checked by
BL	BL	JF

ARCADIS
ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

TREATMENT BUILDING
HVAC SCHEDULES, SPECIFICATIONS & DETAILS

HVAC

ARCADIS Project No.
KC001566.0001.0150

Date
FEBRUARY 26, 2009

ARCADIS U.S., INC.
8725 ROSEHILL
SUITE 350
LENEXA, KANSAS
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H2

STRUCTURAL NOTES

GENERAL:

1. STRUCTURAL DESIGN CONFORMS TO THE REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE, 2006 (IBC 2006).
2. DESIGN LOADS AND DESIGN DATA ARE AS SHOWN IN THE TABLE ON THIS DRAWING.

COORDINATION:

1. STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH, AND COORDINATED WITH, ARCHITECTURAL, MECHANICAL, ELECTRICAL AND OTHER CONTRACT DOCUMENTS.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND LOCATIONS OF COLUMNS, WALLS, AND OPENINGS WITH THE OTHER DISCIPLINES PRIOR TO PROCEEDING WITH THE WORK.
3. COORDINATE THE EXACT SIZE AND LOCATION OF ALL SLEEVES AND OPENINGS THROUGH CONCRETE SLABS OR WALLS WITH ARCHITECTURAL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS. SLEEVES SHALL BE ASTM A 53 SCHEDULE 40 STEEL AND SHALL BE GALVANIZED AFTER CUTTING.

FOUNDATIONS:

1. FOUNDATION DESIGN IS BASED ON A SOIL BEARING CAPACITY OF 1500 PSF TO BE FIELD VERIFIED.
2. ALL COMPACTED FILL, EXCAVATIONS, AND SUBGRADES SHALL BE OBSERVED AND TESTED BY A GEOTECHNICAL ENGINEER TO VERIFY SPECIFIED REQUIREMENTS. VERIFICATION OF ASSUMED SOIL BEARING CAPACITY OF 1500 PSF IS REQUIRED PRIOR TO CONSTRUCTION.
3. CONTROL DENSITY FILL (CDF) SHALL BE WELL GRADED GRANULAR FILL WITH NO MORE THAN 10% PASSING THE 200 SIEVE. COMPACT IN MAXIMUM 8" LOOSE LIFTS TO 95% MODIFIED PROCTOR DENSITY.
4. CARRY FOUNDATIONS TO A LOWER ELEVATION THAN SHOWN ON THE DRAWINGS, IF NECESSARY, TO OBTAIN THE REQUIRED BEARING.
5. ALL EXCAVATIONS SHALL CONFORM TO APPLICABLE HEALTH & SAFETY REGULATIONS.

REINFORCED CONCRETE:

1. UNLESS NOTED OTHERWISE, ALL CONCRETE WORK, DETAILING, FABRICATION, AND PLACING OF REINFORCING BARS AND CONCRETE SHALL BE GOVERNED BY THE LATEST REVISIONS OF:
   A. ACI 301, ACI 315, AND ACI 318
   B. CRSI RECOMMENDED PRACTICE OF PLACING REINFORCING BARS.
   C. ACI 306 AND ACI 305 FOR COLD AND HOT WEATHER CONCRETING RESPECTIVELY.
2. ALL CONCRETE SHALL BE NORMAL WEIGHT (N.W.) AND SHALL HAVE A 28 DAY COMPRESSIVE STRENGTH, OF 4000 PSI. CONCRETE SHALL, BY WEIGHT, HAVE A WATER/CEMENT RATIO OF 0.50 MAXIMUM.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615 AND SHALL HAVE A YIELD STRENGTH OF 60 KSI.
4. MINIMUM CONCRETE COVER SHALL BE PROVIDED IN ACCORDANCE WITH ACI SECTION 7.7.1 AND SHALL BE AS FOLLOWS:

A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	3"
B. CONCRETE EXPOSED TO EARTH OR WEATHER	2"
C. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:	
SLABS, WALLS, BEAMS, COLUMNS, PRIMARY R/F, TIES, STIRRUPS	1 1/2"

MASONRY:

1. ALL MASONRY CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES" (ACI 530-02/ASCE 5-02/TMS 402-02) AND "SPECIFICATION FOR MASONRY STRUCTURES" (ACI 530.1-02/ASCE 6-02/TMS 602-02).
2. CONCRETE MASONRY UNITS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C 90 AND SHALL HAVE FACTORY INSTALLED INSULATION INSERTS KORFIL OR AS APPROVED.
3. MINIMUM REQUIRED COMPRESSIVE STRENGTH OF MASONRY ASSEMBLAGE, F'm, AT 28 DAYS SHALL BE 1500 PSI.
4. MORTAR SHALL CONFORM TO THE REQUIREMENTS OF ASTM C 270 FOR JOB-MIXED MORTAR AND ASTM C 1142 FOR READY MIXED MORTAR AND SHALL BE TYPE S.
5. GROUT FOR HOLLOW MASONRY UNITS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C 476 AND SHALL HAVE A 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI.
6. CONTRACTOR SHALL PROVIDE ADEQUATE TEMPORARY BRACING AND SHORING OF MASONRY WALLS AGAINST WIND LOADS, CONSTRUCTION LOADS, AND OTHER TEMPORARY FORCES UNTIL SUCH PROTECTION IS NO LONGER REQUIRED FOR THE SAFE SUPPORT OF THE MASONRY WALLS.
7. MASONRY REINFORCING SPLICE / LAP LENGTH SHALL BE 48 x BAR ø

STRUCTURAL STEEL FRAMED BUILDING:

1. UNLESS NOTED OTHERWISE, ALL DESIGN, DETAILING, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE AISC "MANUAL OF STEEL CONSTRUCTION", 13th EDITION (AISC 360) AND THE AISC CODE OF STANDARD PRACTICE.
2. ALL STEEL SHALL HAVE A STRENGTH OF 36 KSI MINIMUM.
3. SHOP DRAWINGS SHALL BE PREPARED UNDER THE SUPERVISION OF AND SHALLED BE SEALED BY, A MISSOURI PROFESSIONAL ENGINEER. SUBMIT SHOP DRAWINGS, COLUMN LOADING COMBINATIONS AND CALCULATIONS IF REQUESTED.
4. ALL STEEL SHALL RECEIVE ONE COAT OF FACTORY PRIMER PAINT.
5. FABRICATE STEEL FOR SHOP WELDED CONECTIONS AND FIELD BOLTED CONNECTIONS.
6. STANDING SEAM METAL ROOF TO BE MADE OF 24" WIDE PANELS AND RIB SPACING X 3" DEEP RIBS, 22 GUAGE MINIMUM, THAT HAS A WIND UPLIFT RATING MEETING UL-90. PANEL TO BE GALVINIZED G-90 COATED WITH KYNAR FINISH COLOR SELECTED BY OWNER. PROVIDE 20 YEAR PANEL FINISH WARRANTY AND WEATHERTIGHTNESS WARRANTY.
7. WALL PANEL TO BE 36" WIDE NET COVERAGE WITH 1 3/16" HIGH RIBS @ 12" C/C. CONTINUOUS PANEL SILL TO EAVE. PANEL TO BE GALVINIZED G-90 COATED WITH KYNAR FINISH COLOR SELECTED BY OWNER. PROVIDE 20 YEAR PANEL FINISH WARRANTY AND WEATHERTIGHTNESS WARRANTY.

ABBREVIATIONS USED IN DRAWINGS:

@	AT
ARCH	ARCHITECT OR ARCHITECTURAL
ACI	AMERICAN CONCRETE INSTITUTE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
B/W	BETWEEN
CL	COLUMN CENTER LINE
℄	CENTERLINE
CJ	CONCRETE CONTROL JOINT
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CRSI	CONCRETE REINFORCING STEEL INSTITUTE
DWG	DRAWING
ø	DIAMETER
EA	EACH
E.W.	EACH WAY
EXT.	EXTERIOR
FTG.	FOOTING
F.F.	FINISHED FLOOR
HORIZ	HORIZONTAL
INT.	INTERIOR
LSV	LONG SIDE VERTICAL
MAX	MAXIMUM
MIN	MINIMUM
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
O/	OVER
R/F	REINFORCE, REINFORCED OR REINFORCING
S.S.V.	SHORT SIDE VERTICAL
STD	STANDARD
T&B	TOP & BOTTOM
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
VERT	VERTICAL
W/	WITH

REINFORCING BAR LAP SPLICE DIMENSION TABLE

BAR SIZE US	BAR SIZE METRIC	TOP BARS	OTHER BARS
# 3	# 10	16"	12"
# 4	# 13	20"	16"
# 5	# 16	26"	20"
# 6	# 19	30"	24"
# 7	# 22	42"	34"
# 8	# 25	48"	38"
# 9	# 29	56"	44"
# 10	# 32	62"	50"
# 11	# 36	68"	54"

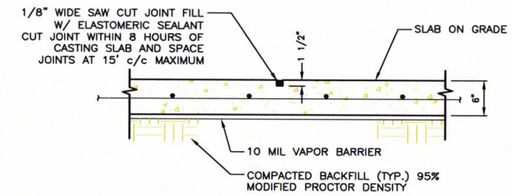
1. WHEN LAPPING TWO DIFFERENT SIZE BARS, THE SPLICE DIMENSION OF THE SMALLER BAR SHALL BE USED.
2. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BARS.
3. THE ABOVE TABLE IS BASED UPON 4000 PSI CLASS I CONCRETE, UNCOATED 60 KSI STEEL, MINIMUM BAR SPACING = 5 BAR DIAMETERS AND ACI CLASS B SPLICES. WHEN THESE CONDITIONS ARE NOT MET, SPLICE LENGTH SHALL BE DETERMINED IN ACCORDANCE WITH ACI 318-99.

TREATMENT BUILDING
DESIGN INFORMATION (IBC 20006)

R - VALUE INSULATIONS	ROOF	10
	WALLS	CMU 2 & METAL FRAME 10
DESIGN FLOOR LIVE LOAD		250 psf
DESIGN ROOF LIVE LOAD		30 psf
COLLATERAL LOAD		10 psf
DESIGN ROOF SNOW LOAD		
GROUND SNOW LOAD, Pg		20 PSF
FLAT ROOF SNOW LOAD, Pf		14.0 PSF
SNOW LOAD IMPORTANCE FACTOR, Is		1.0
SNOW EXPOSURE FACTOR, Ce		0.9
THERMAL FACTOR, Ct		1.0
WIND DESIGN DATA		
BASIC WIND SPEED		90 MPH
WIND LOAD IMPORTANCE FACTOR, Iw		1.15
WIND EXPOSURE C		
OCCUPANCY CATEGORY II		
INTERNAL PRESSURE COEFFICIENT:		
±.55 FOR WIND ON WEST WALL,		
±.18 ELSEWHERE		
COMPONENTS AND CLADDING LOADS		
ROOF: -43 PSF MAX		
WALLS: -23 PSF MAX		

EARTHQUAKE DESIGN DATA
- OCCUPANCY CATEGORY II
- SEISMIC LOAD IMPORTANCE FACTOR, Ie= 1.25
- MAPPED SPECTRAL RESPONSE ACCELERATIONS
  - Ss 0.18
  - S1 0.085
- SPECTRAL RESPONSE COEFFICIENTS
  - Sds 0.192
  - Sd1 0.136
- SITE CLASS D
- SEISMIC DESIGN CATEGORY B
- BASIC SEISMIC FORCE RESISTING SYSTEM
  - BY BUILDING MANUFACTURER
- DESIGN BASE SHEAR
  - BY BUILDING MANUFACTURER
- SEISMIC RESPONSE COEFFICIENT, Cs
  - BY BUILDING MANUFACTURER
- RESPONSE MODIFICATION FACTOR, R
  - BY BUILDING MANUFACTURER
- ANALYSIS PROCEDURE
  - BY BUILDING MANUFACTURER

PRESUMPTIVE ALLOWABLE NET SOIL BEARING PRESSURE 1500 PSF



SLAB CONTRACTION JOINT DETAIL
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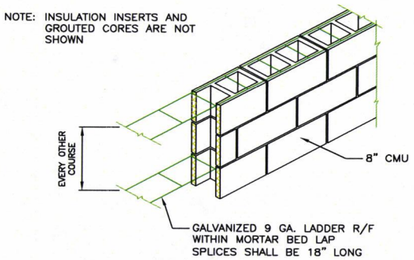

MASONRY HORIZONTAL R/F DETAIL
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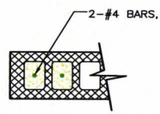

TYPICAL MASONRY R/F AT JAMB
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No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	BL	JF

Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)
State: MO | Date Signed: | Project Mgr.: BO
Designed by: RK | Drawn by: RR | Checked by: RK

ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

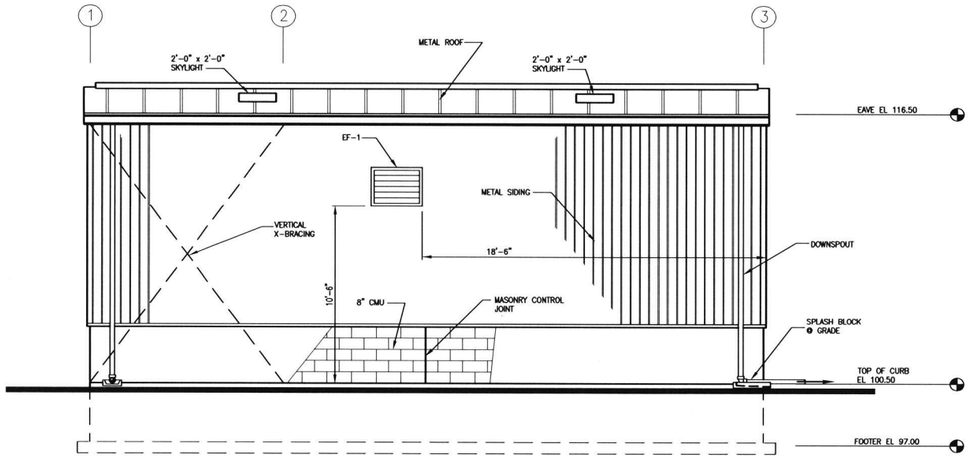
STRUCTURAL NOTES

STRUCTURAL

ARCADIS Project No. KC001566.0001.0150
Date FEBRUARY 26, 2009

ARCADIS U.S., INC.
8725 ROSEHILL
SUITE 350
LENEXA, KANSAS
TEL. 913.492.0900

S1



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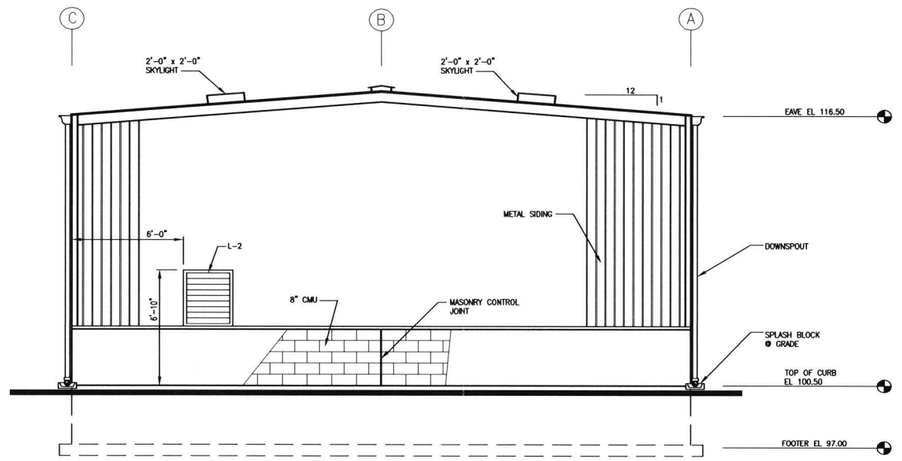

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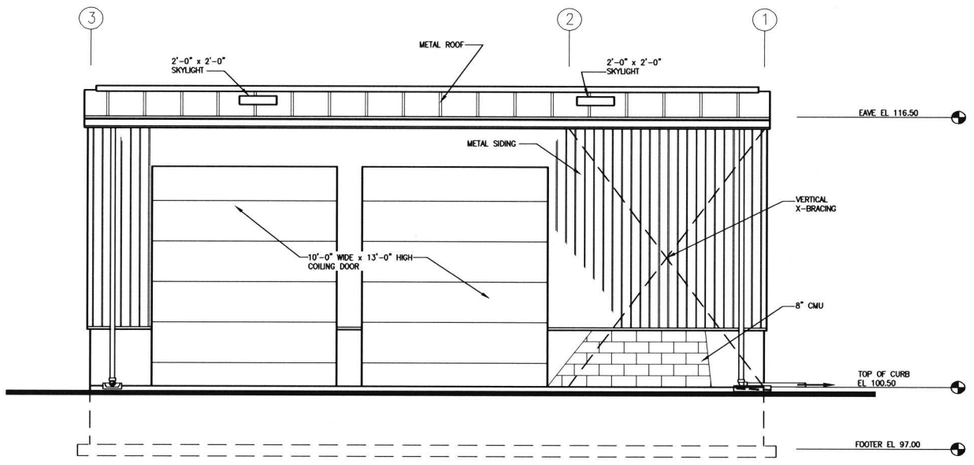

EAST ELEVATION

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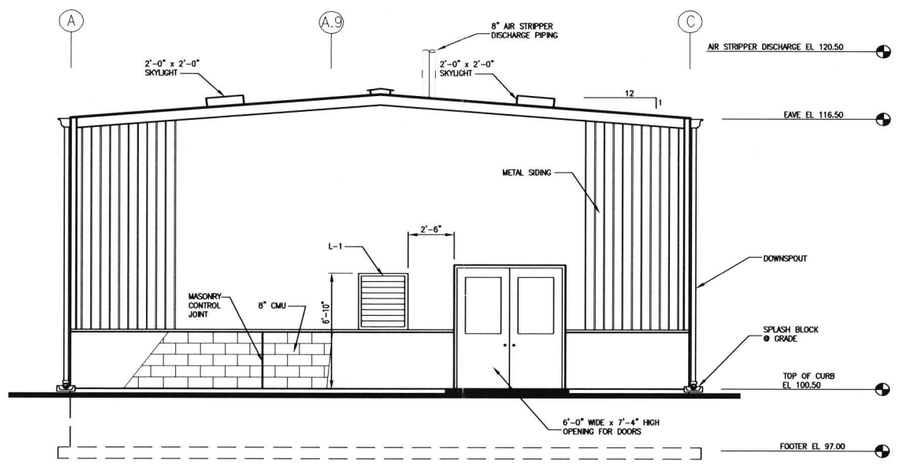

SOUTH ELEVATION

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No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	BL	JF

Professional Engineer's Name: **ROYCE FACE**

Professional Engineer's No.: (PE NUM)

State	Date Signed	Project Mgr.
MO		BO
Designed by	**Drawn by**	**Checked by**
RK	RR	RK

ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI

DESIGN / BID DRAWINGS

BUILDING ELEVATIONS

STRUCTURAL

ARCADIS Project No.: KC001566.0001.0150

Date: FEBRUARY 26, 2009

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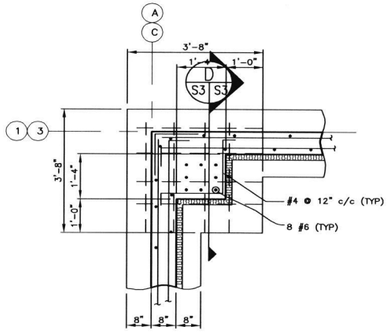
S2



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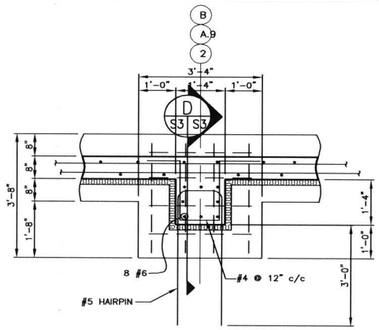

B S3 S3 PLAN DETAIL 2 (TYP. FOR 4)
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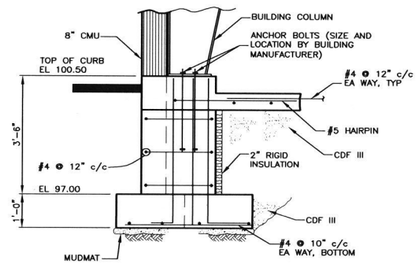
NOTE: FOUNDATION DETAILS AND DIMENSIONS TO BE VERIFIED BASED ON BUILDING MANUFACTURER'S APPROVED SHOP DRAWINGS.



D S3 S3 SECTION
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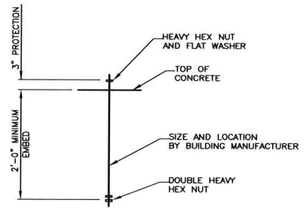
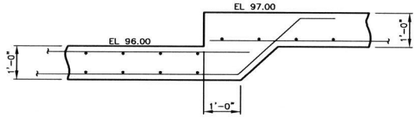
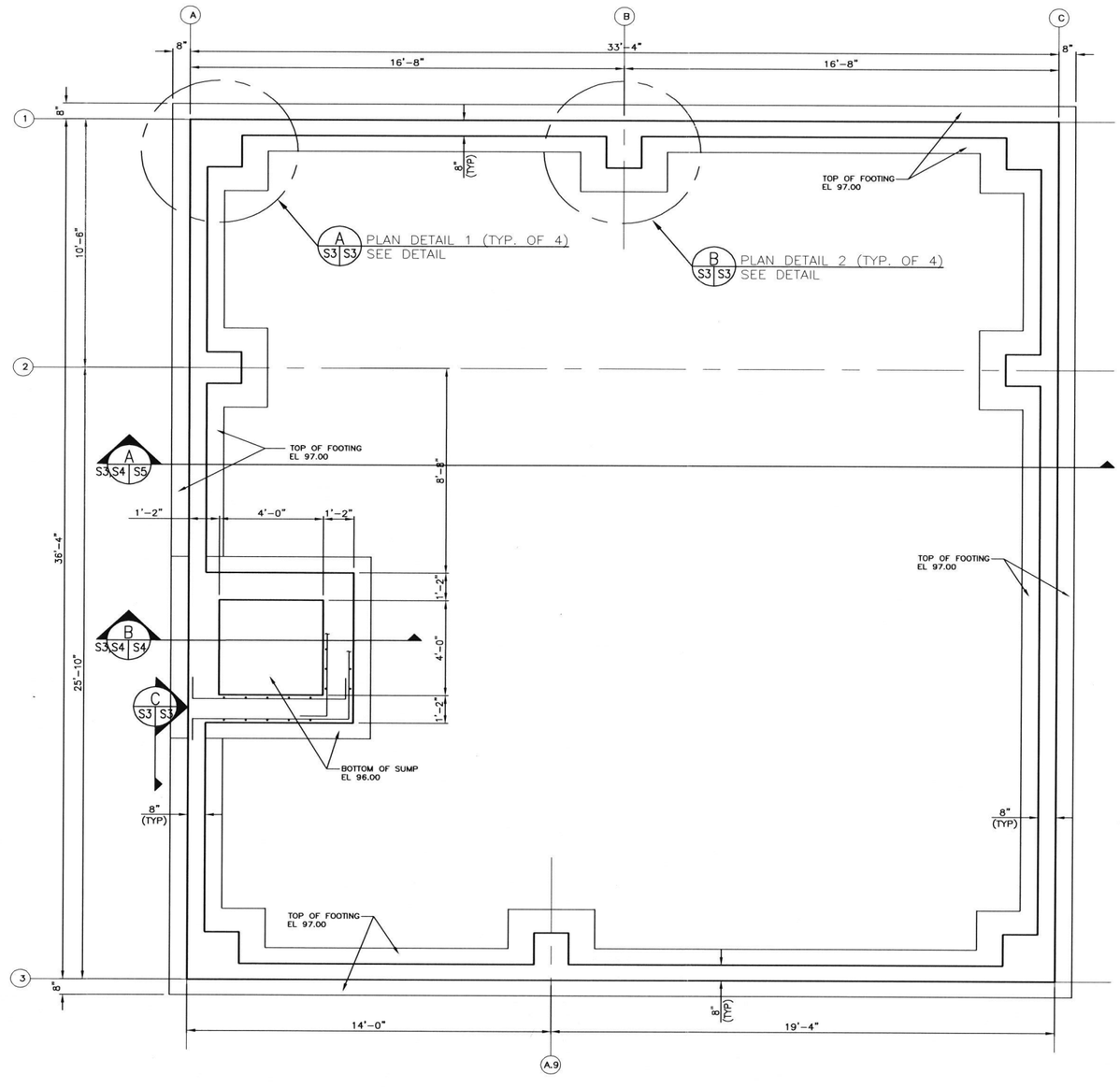


ANCHOR BOLT DETAIL
NOT TO SCALE



C S3 S3 PLAN DETAIL 3
SCALE: 1/2"=1'-0"

N



FOUNDATION PLAN
SCALE: 3/8"=1'-0"

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No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	BL	JF

Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)

State	Date Signed	Project Mgr.
MO		BO
Designed by	Drawn by	Checked by
RK	RR	RK

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ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

FOUNDATION PLAN

STRUCTURAL

ARCADIS Project No.
KC001566.0001.0150

Date
FEBRUARY 26, 2009

ARCADIS U.S., INC.
8725 ROSEHILL
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LENEXA, KANSAS
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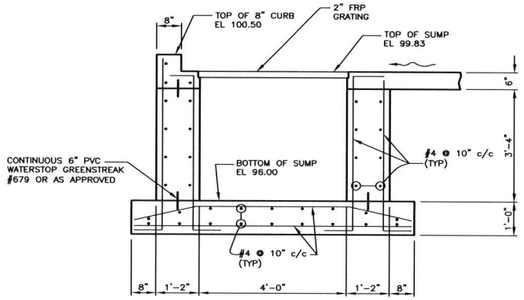
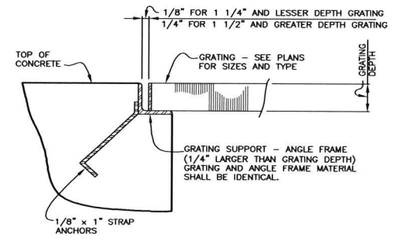
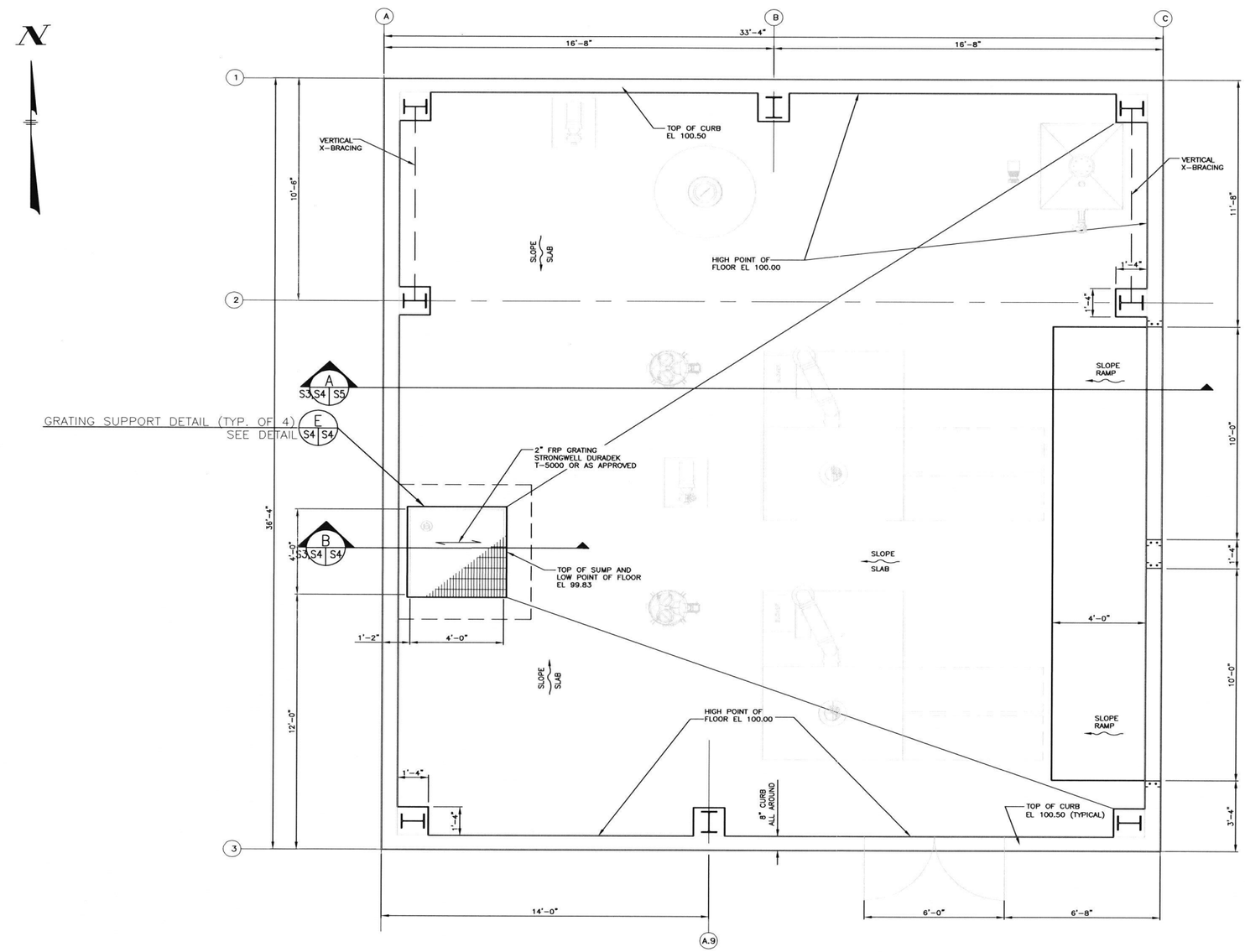
S3



B SUMP SECTION
S3 S4 S4 SCALE: 1/2"=1'-0"



E GRATING SUPPORT DETAIL (TYP. FOR 4)
S4 S4 NOT TO SCALE



FLOOR PLAN
SCALE: 3/8"=1'-0"

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No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	BL	JF

Professional Engineer's Name
ROYCE FACE
Professional Engineer's No.
(PE NUM)

State	Date Signed	Project Mgr.
MO		BO
Designed by	Drawn by	Checked by
RK	RR	RK

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WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

FLOOR PLAN

STRUCTURAL

ARCADIS Project No.
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Date
FEBRUARY 26, 2009

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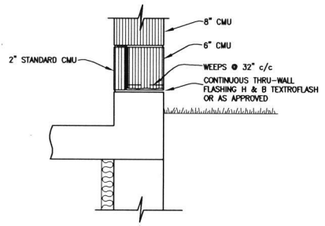
S4



F S5 S5 PLAN DETAIL 4
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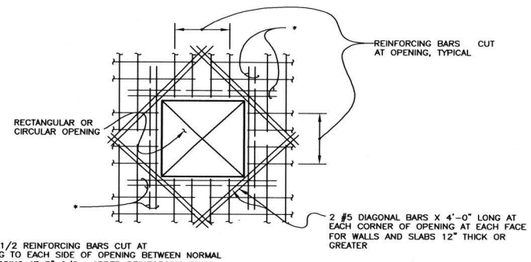

TYPICAL REINFORCING AROUND OPENINGS IN SLABS AND WALLS

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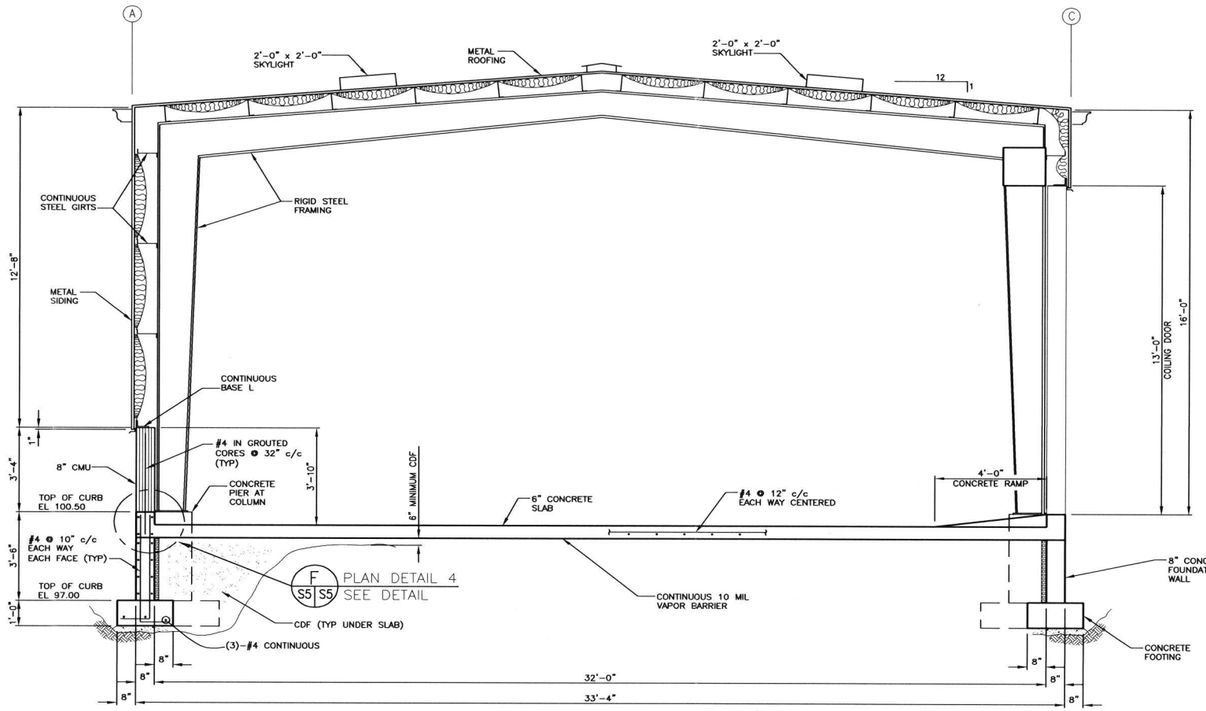

A S3 S4 S5 BUILDING DETAIL
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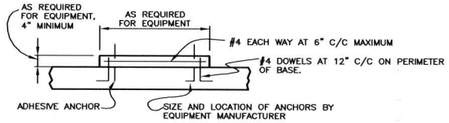

EQUIPMENT PAD DETAIL

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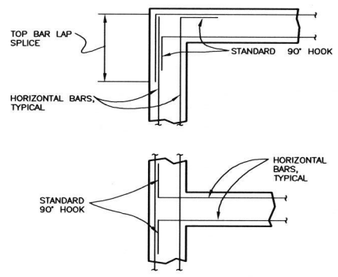

TYPICAL WALL INTERSECTION REINFORCING DETAILS

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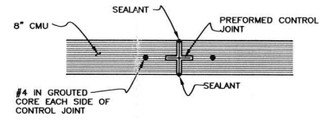

MASONRY CONTROL JOINT DETAIL

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XREFS: IMAGES: PROJECTNAME: ---

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No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	BL	JF

Professional Engineer's Name: **ROYCE FACE**
Professional Engineer's No.: (PE NUM)

State	Date Signed	Project Mgr.
MO		BO
Designed by	Drawn by	Checked by
RK	RR	RK

ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

SECTIONS AND DETAILS

STRUCTURAL

ARCADIS Project No. KC001566.0001.0150
Date FEBRUARY 26, 2009

ARCADIS U.S., INC.
8725 ROSEHILL
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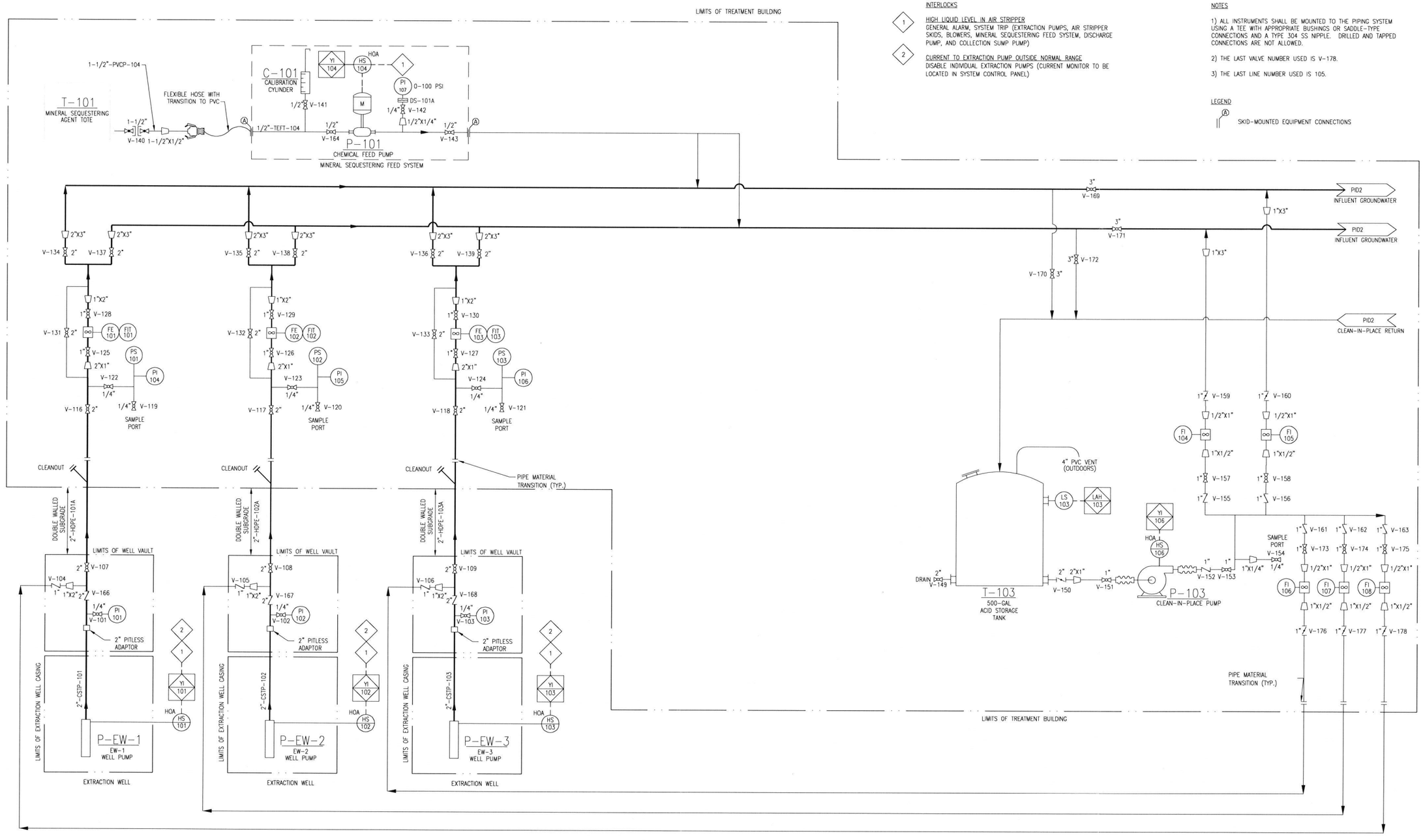
S5



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SCALE(S) AS INDICATED

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No.	Date	Revisions	By	Ckd
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0	07/21/09	ISSUED FOR BID	RD	JF

Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)

State	Date Signed	Project Mgr.
MO		BO
Designed by	Drawn by	Checked by
RD	MS	JF

ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

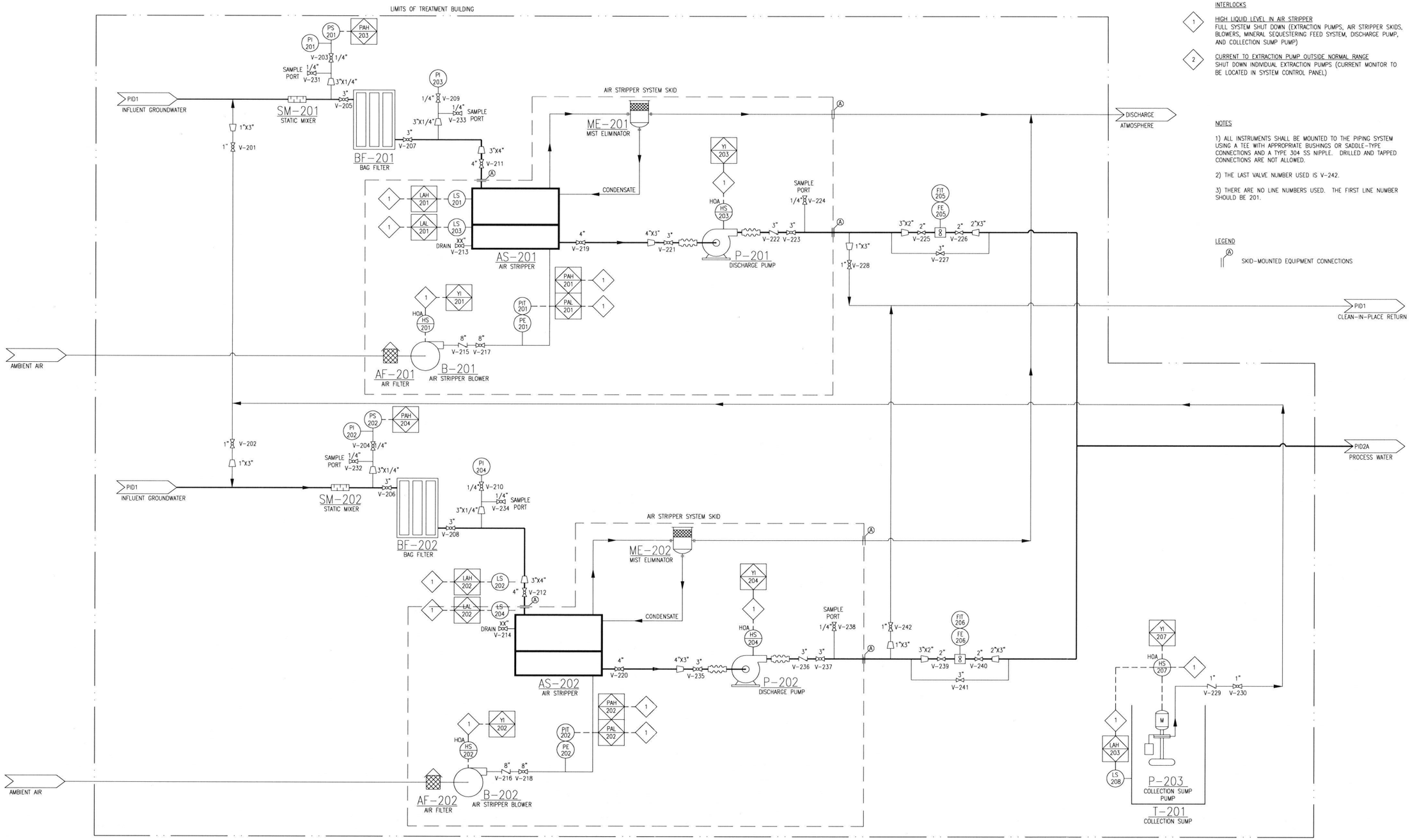
PIPING AND INSTRUMENTATION DIAGRAM

PROCESS

ARCADIS Project No.: KC001566.0001.0150
Date: MAY 2011

ARCADIS U.S., INC.
8725 ROSEHILL
SUITE 350
LENEXA, KANSAS
TEL. 913.492.0900

PID1



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XREFS: IMAGES: PROJECTNAME:

SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
1	05/21/2011	RECORD DRAWINGS	RD	JF
0	07/21/09	ISSUED FOR BID	RD	JF

Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)

State	Date Signed	Project Mgr.
MO		BO
Designed by	Drawn by	Checked by
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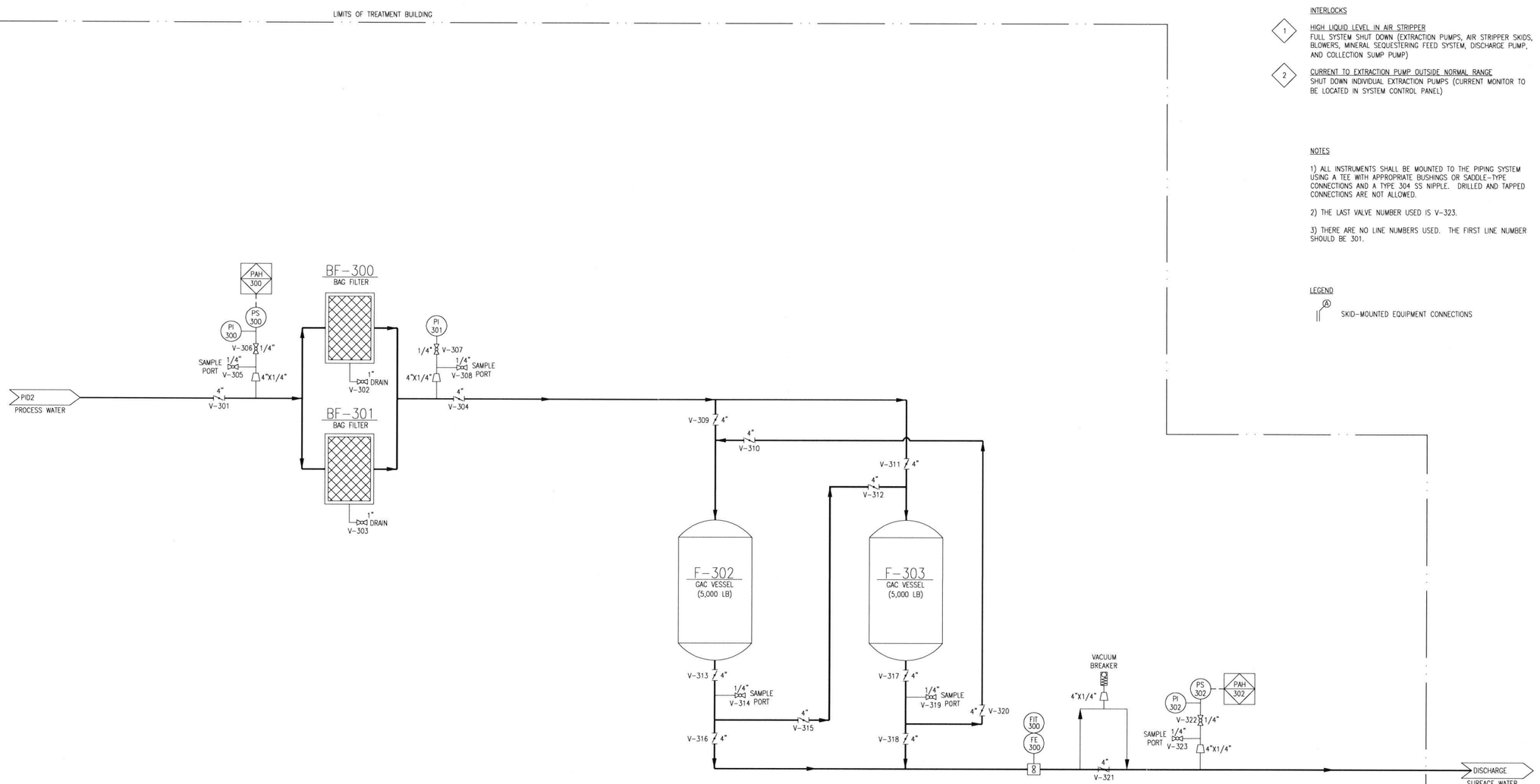

INTERLOCKS

1 — HIGH LIQUID LEVEL IN AIR STRIPPER
FULL SYSTEM SHUT DOWN (EXTRACTION PUMPS, AIR STRIPPER SKIDS, BLOWERS, MINERAL SEQUESTERING FEED SYSTEM, DISCHARGE PUMP, AND COLLECTION SUMP PUMP)

2 — CURRENT TO EXTRACTION PUMP OUTSIDE NORMAL RANGE
SHUT DOWN INDIVIDUAL EXTRACTION PUMPS (CURRENT MONITOR TO BE LOCATED IN SYSTEM CONTROL PANEL)

NOTES

1) ALL INSTRUMENTS SHALL BE MOUNTED TO THE PIPING SYSTEM USING A TEE WITH APPROPRIATE BUSHINGS OR SADDLE-TYPE CONNECTIONS AND A TYPE 304 SS NIPPLE. DRILLED AND TAPPED CONNECTIONS ARE NOT ALLOWED.

2) THE LAST VALVE NUMBER USED IS V-323.

3) THERE ARE NO LINE NUMBERS USED. THE FIRST LINE NUMBER SHOULD BE 301.

LEGEND

A — SKID-MOUNTED EQUIPMENT CONNECTIONS

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PID2A

MOTOR DRIVEN EQUIPMENT

CENTRIFUGAL PUMP

FAN / BLOWER

SUBMERSIBLE PUMP

CHEMICAL FEED PUMP

MISCELLANEOUS SYMBOLS

HOA HAND-OFF-AUTO

I AND OR INTERLOCKING FUNCTIONS

GENERALIZED SPECIFIC

PRIME MOVERS FOR MOTOR DRIVEN EQUIPMENT

M ELECTRIC MOTOR

PIPING ACCESSORIES AND DETAILS

MIXING SECTION

CHEMICAL SEAL

EXPANSION JOINT

FLEX HOSE

CAM LOCK FITTING

AIR FILTER

MIST ELIMINATOR

CONCENTRIC REDUCER

PIPING SYMBOLS

PRIMARY PROCESS FLOW PATH

SECONDARY FLOW PATH

VALVE SYMBOLS

GATE

BALL

BUTTERFLY

CHECK

DRY DISCONNECT

TANK ACCESSORIES

MANHOLE/ACCESS

FLANGED NOZZLE

SYMBOLS FOR FLOW MEASUREMENT

FE

E

TURBINE OR PROPELLER TYPE PRIMARY ELEMENT

TYPICAL SYMBOLS FOR BEHIND-THE-PANEL INSTRUMENT OR NORMALLY INACCESSIBLE FUNCTION.

(1) (2) (MAIN) (AUX.)

SYMBOL FOR PANEL MOUNTED INSTRUMENTS MAY HAVE PANEL DESIGNATION. IF PROJECT HAS A NUMBER OF PANELS.

INSTRUMENT FOR MULTIPLE SERVICE OR MULTIPLE FUNCTIONS SHALL BE REPRESENTED BY TWO OR MORE TANGENT CIRCLES.

PIPE LINE DESIGNATION

6"–S04P–101A

- 6" – SIZE
- S04 – MATERIAL
- P – LINE TYPE
- 101A – LINE NUMBER
- BRANCH

MATERIAL

BRZ	– BRASS/BRONZE	PET	– POLYETHYLENE
CIR	– CAST IRON	POP	– POLYPROPYLENE
CST	– CARBON STEEL	PVC	– POLYVINYL CHLORIDE
CPR	– COPPER	RUB	– RUBBER
CVC	– CHLORINATED POLYVINYL CHLORIDE	S04	– 304 STAINLESS STEEL
DIR	– DUCTILE IRON	S4L	– 304L STAINLESS STEEL
FRP	– FIBERGLASS	S16	– 316 STAINLESS STEEL
GCS	– GALVANIZED CARBON STEEL	S6L	– 316L STAINLESS STEEL
LCS	– LINED CARBON STEEL	TEF	– TEFLON
		VIT	– VITON

TYPE

D = DUCT P = PIPE C = DOUBLE WALL CONTAINMENT PIPE
H = HOSE T = TUBE

INSTRUMENT IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURE OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A = ANALYSIS		ALARM		
B = BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C = USER'S CHOICE			CONTROL	
D = USER'S CHOICE	DIFFERENTIAL			
E = VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F = FLOW RATE	RATIO (FRACTION)			
G = USER'S CHOICE		GLASS, VIEWING DEVICE		
H = HAND				HIGH
I = CURRENT (ELECTRICAL)		INDICATE		
J = POWER	SCAN			
K = TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L = LEVEL		LIGHT		LOW
M = USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N = USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O = USER'S CHOICE		ORIFICE, RESTRICTION		
P = PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q = QUANTITY	INTERGRATE, TOTALIZE			
R = RADIATION		RECORD		
S = SPEED, FREQUENCY	SAFETY		SWITCH	
T = TEMPERATURE			TRANSMIT	
U = MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V = VIBRATION, MECH. ANALYSIS			VALVE, DAMPER, LOUVER	
W = WEIGHT, FORCE		WELL		
X = UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y = EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z = POSITION, DIMENSION	Z AXIS		DRIVE, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

NOTES:
1. ANY FIRST LETTER COMBINED WITH MODIFIER REPRESENTS A NEW AND SEPARARE MEASURED VARIABLE. EXAMPLES: PD = DIFFERENTIAL PRESSURE FQ = TOTALIZED OR INTEGRATED FLOW. EXCEPTION IS THE MODIFIER "J" FOR MULTIPOINT SCANNING.
2. FOR ANALYSIS NOT IDENTIFIED BY A SPECIFIC LETTER IN THE TABLE, USE FIRST LETTER "A" NEAR THE INSTRUMENT SYMBOL SPECIFY THE NATURE OF THE ANALYSIS. EXAMPLE: PH
3. MEANING OF A "USER CHOICE" LETTER SHALL BE CONSISTENT THROUGHOUT A PROJECT, AND SHALL BE SPECIFIED IN THE DRAWING LEGEND.
4. UNCLASSIFIED LETTER MAY HAVE A FEW DIFFERENT MEANINGS ON A PROJECT, THE MEANING SHALL BE SPCIFIED NEAR EACH INSTRUMENT SYMBOL USING THE UNCLASSIFIED LETTER.
5. THE MODIFIER "SCAN" APPLIES TO MULTIPOINT PRINTING INSTRUMENTS, SUCH AS CLRS (MULTIPOINT CONDUCTIVITY RECORDER WITH ALARM SWITCHES).

GENERAL NOTES:

1. THIS DRAWING IS PROVIDED FOR INFORMATION ONLY.

INSTRUMENT SYMBOLS

	PRIMARY CONTROL PANEL NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY PANEL OR RACK NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS	⊖	○	⊖
SHARED DISPLAY, SHARED CONTROL	⊡	⊡	⊡
COMPUTER FUNCTION INCLUDING DISTRIB. CNTL. SYS.	⬡	⬡	⬡
PROGRAMMABLE LOGIC CONTROLLER FUNCTION	⊠	⊠	⊠

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Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)

State	Date Signed	Project Mgr.
MO		BO
Designed by	Drawn by	Checked by
RD	MS	JF

ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

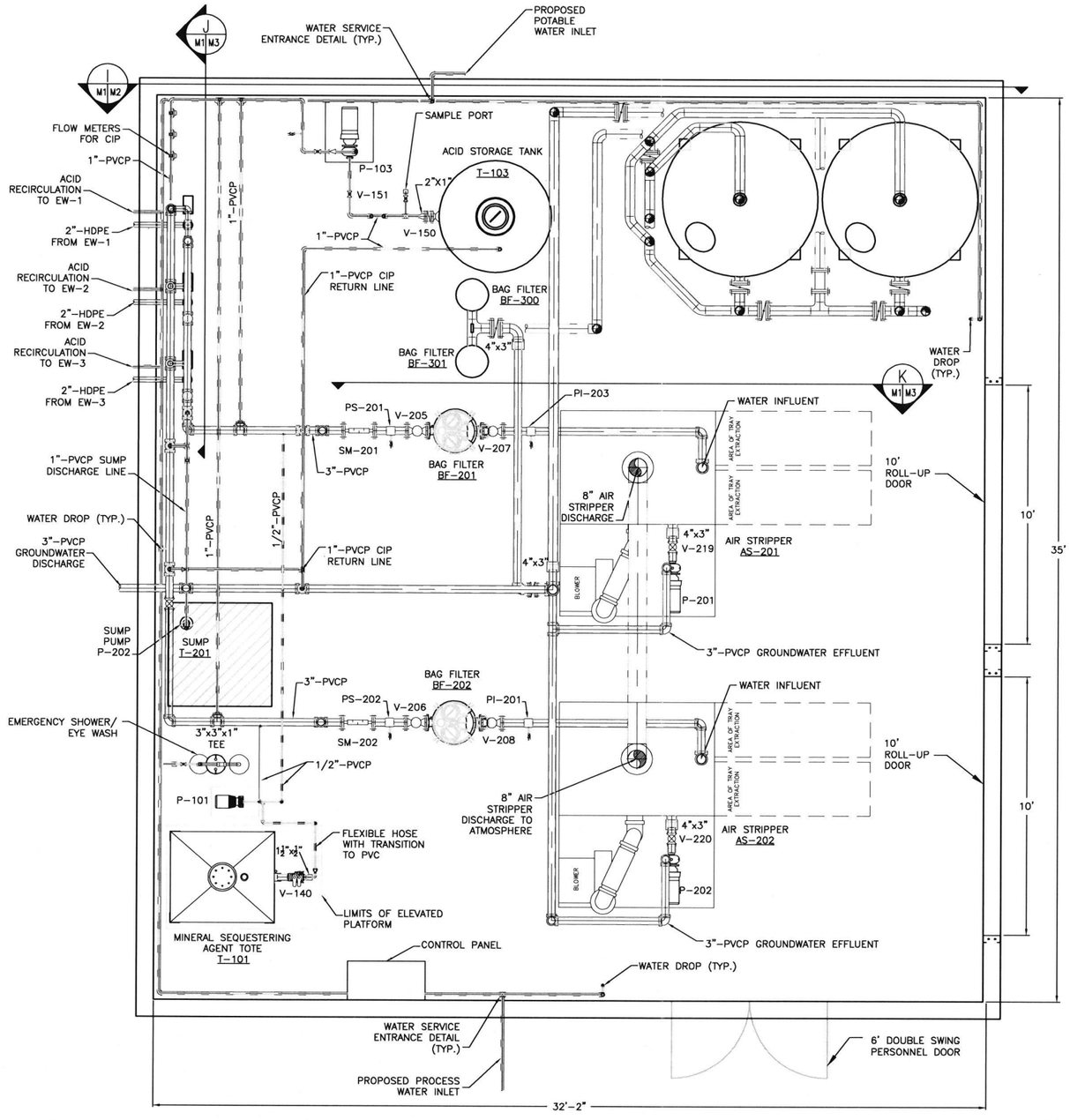
PIPING AND INSTRUMENTATION DIAGRAM DETAILS SHEET

PROCESS

ARCADIS Project No.: KC001566.0001.0150
Date: MAY 2011

ARCADIS U.S., INC.
8725 ROSEHILL
SUITE 350
LENEXA, KANSAS
TEL. 913.492.0900

PID3



NOTES:

1. CONTRACTOR SHALL FURNISH AS-BUILT DRAWINGS WITH CERTIFIED SURVEY TO VERIFY ELEVATIONS AND LOCATIONS.
2. ALL PIPING LOCATIONS TO BE FIELD VERIFIED BY CONTRACTOR WITH ENGINEER APPROVAL PRIOR TO INSTALLATION.
3. PROVIDE APPROPRIATE SUPPORTS FOR ALL PIPING AS DESCRIBED IN SPECIFICATIONS.
4. ALL PIPING AND VALVES SHALL BE ASSEMBLED PER THE PROCESS AND INSTRUMENTATION DRAWINGS AND SPECIFICATIONS.

0 30' 60' 90'
SCALE IN FEET

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ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

TREATMENT BUILDING LAYOUT

MECHANICAL

ARCADIS Project No.: KC001566.0001.0150
Date: MAY 2011

ARCADIS U.S., INC.
8725 ROSEHILL
SUITE 350
LENEXA, KANSAS
TEL. 913.492.0900

M1

CITY: DIV/GROUP: DB: LD: PIC: PM: TM: LYR:ON=*;OFF=*REF*
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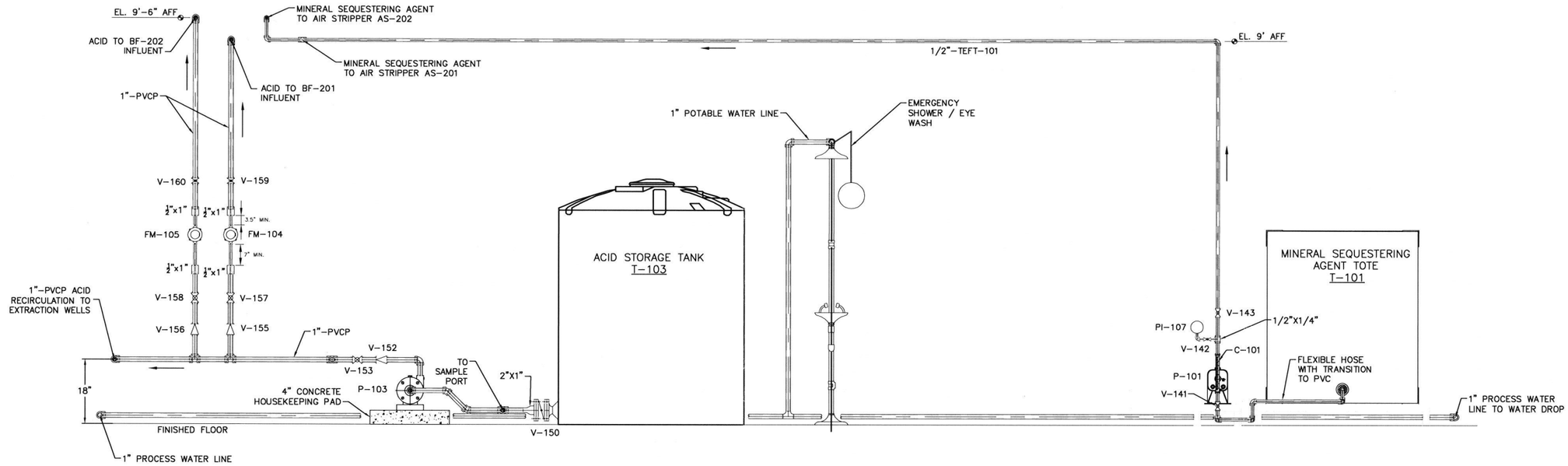

1 M1 M2 WEST ELEVATION DETAIL
SCALE: 1:10

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Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)

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Designed by	Drawn by	Checked by
MS	MS	JF

ARCADIS
ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
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TREATMENT BUILDING SECTIONS

MECHANICAL

ARCADIS Project No.: KC001566.0001.0150
Date: MAY 2011

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8725 ROSEHILL
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LENEXA, KANSAS
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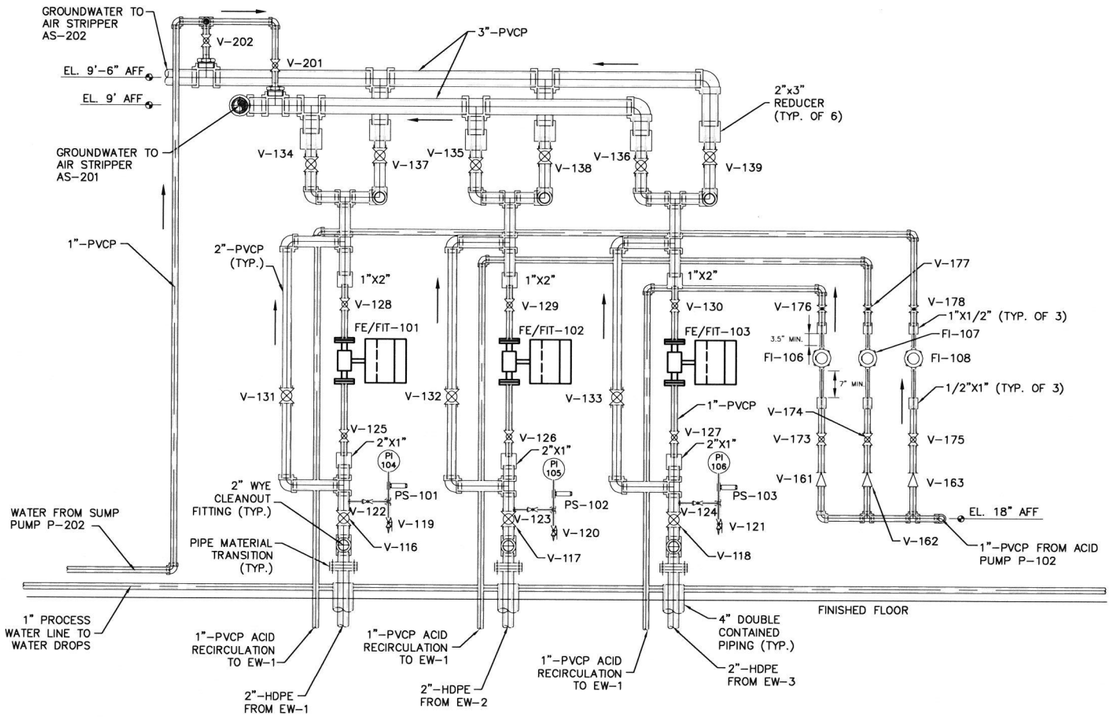
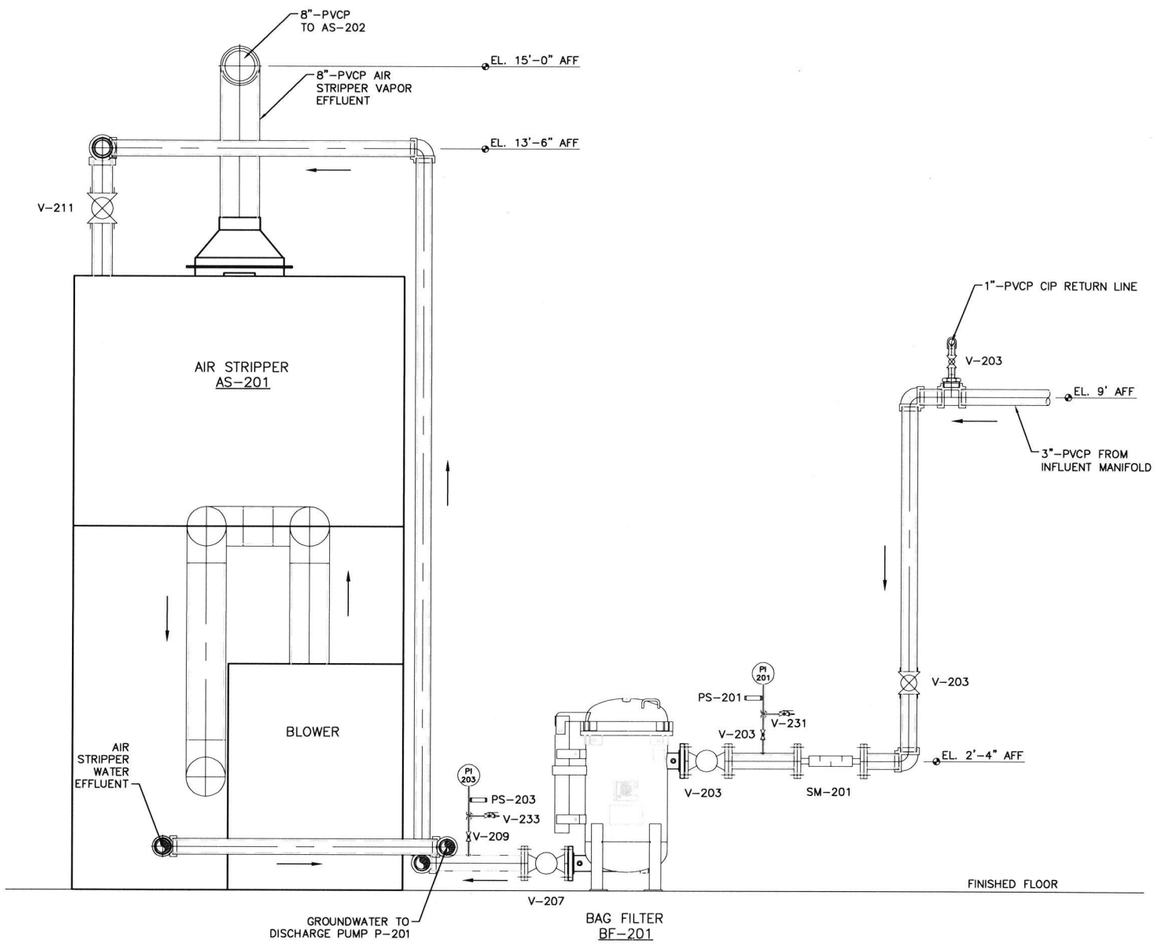
M2



J / M1 M3 INFLUENT MANIFOLD DETAIL
SCALE: 3/4"=1'-0"



K / M1 M3 AIR STRIPPER SECTION
SCALE: 3/4"-1'-0"

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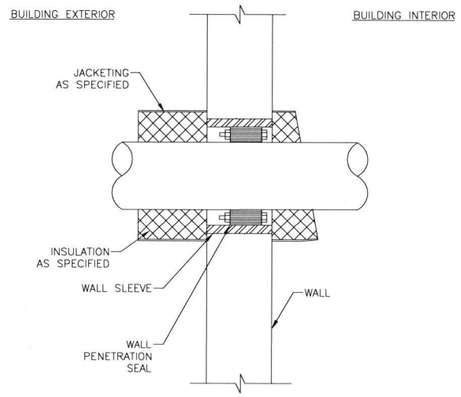
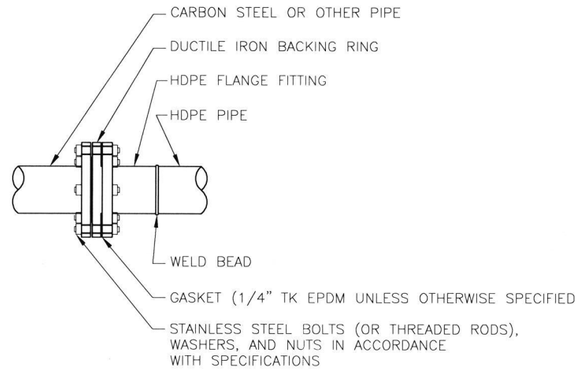
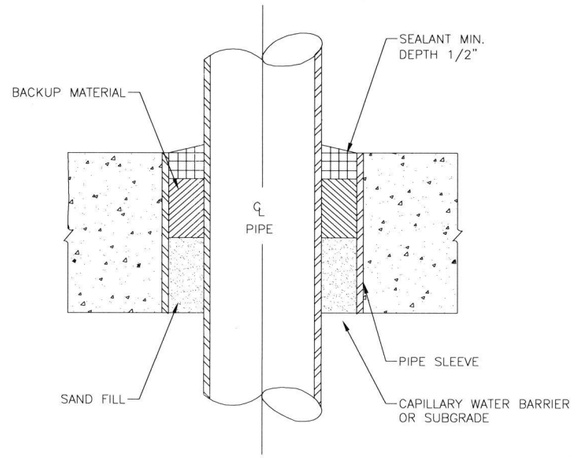
M3



M1 M4 INSULATED PIPE WALL PENETRATION DETAIL (TYP.)
NOT TO SCALE

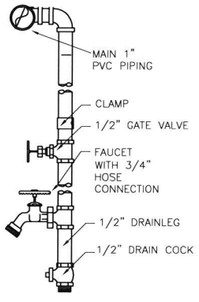


M1 M4 PIPE MATERIAL TRANSITION DETAIL (TYP.)
NOT TO SCALE

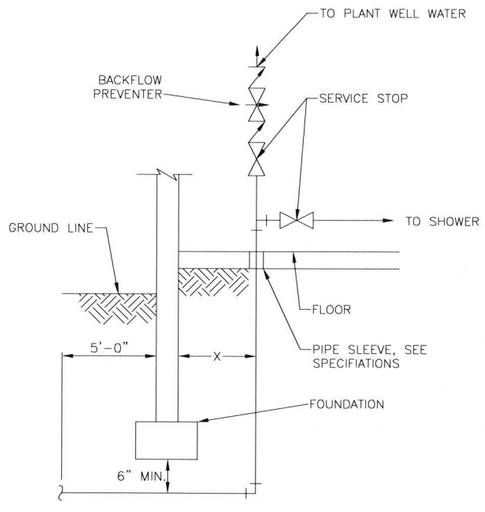


REFER TO DETAIL _ FOR DETAILS ON BOOTING PIPE TO SUBSLAB GEOMEMBRANE

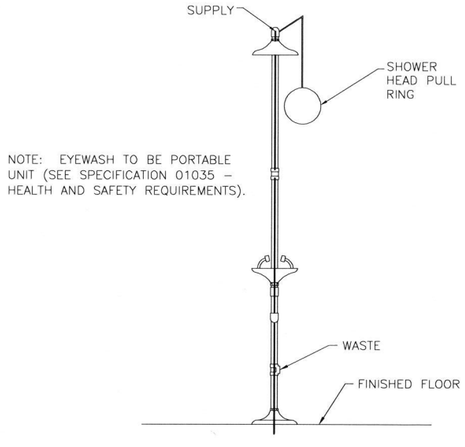
M1 M4 FLOOR PIPE SLEEVE DETAIL (TYP.)
NOT TO SCALE



M1 M4 WATER DROP (TYP.)
NOT TO SCALE



M1 M4 WATER SERVICE ENTRANCE DETAIL (TYP.)
NOT TO SCALE



M1 M4 EMERGENCY SHOWER (TYP.)
NOT TO SCALE

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MECHANICAL DETAILS

MECHANICAL

ARCADIS Project No. KC001566.0001.0150
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8725 ROSEHILL
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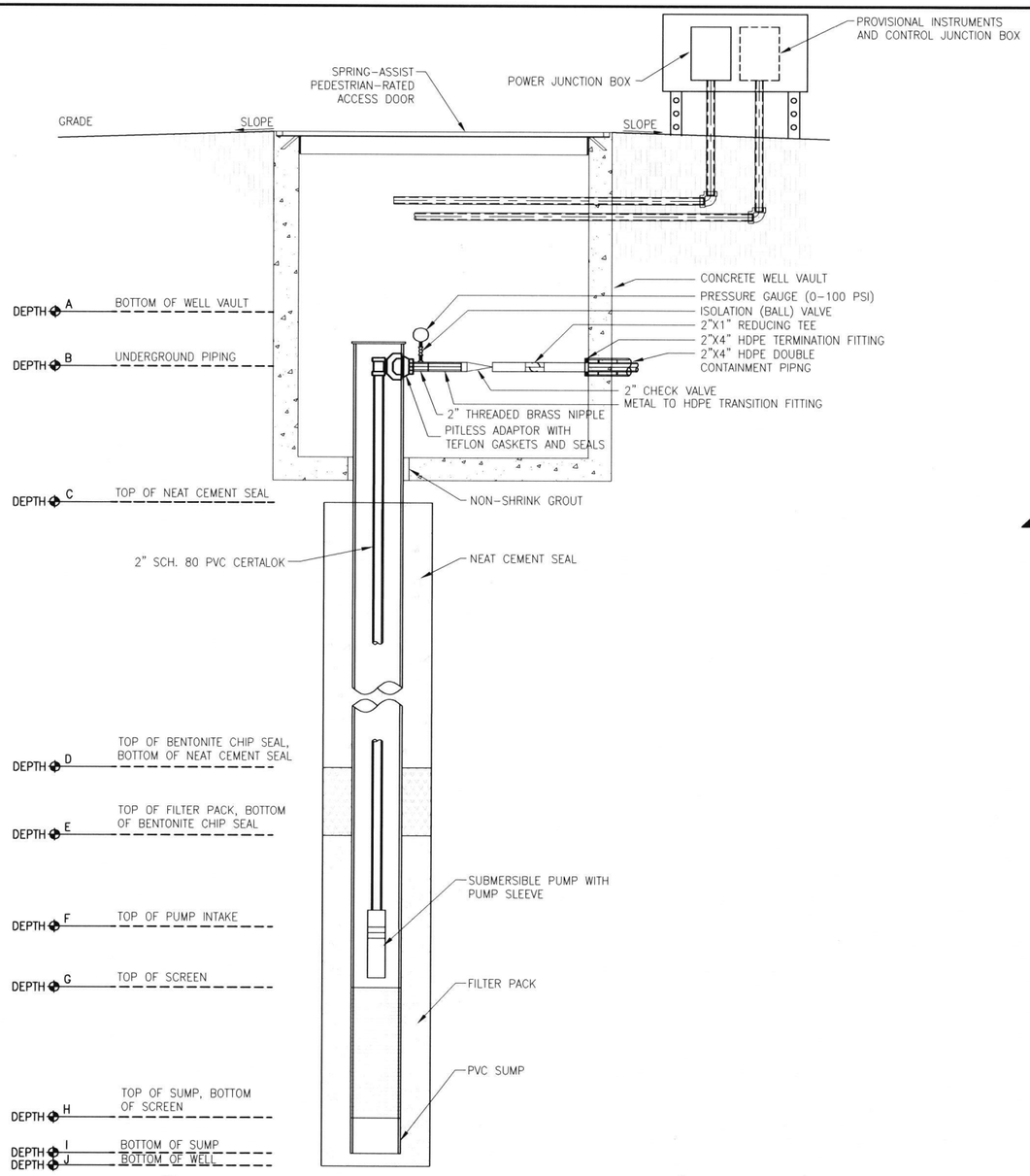
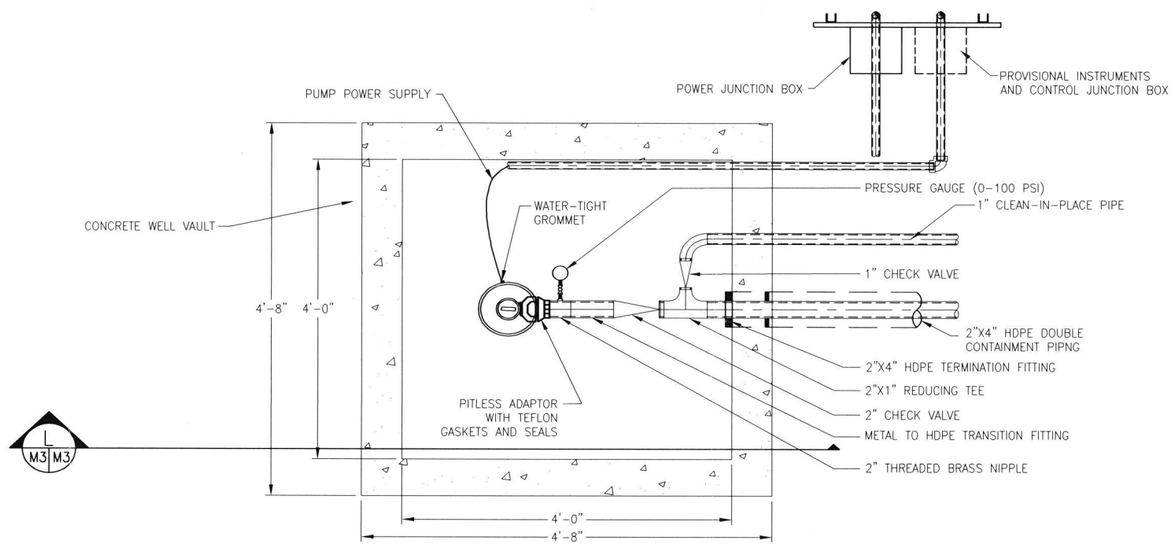
M4



L / M3 | M3 GROUNDWATER EXTRACTION WELL DETAIL (TYP. OF 3)
NOT TO SCALE



K / C1 | M3 GROUNDWATER EXTRACTION WELL VAULT PLAN (TYP. OF 3)
NOT TO SCALE

WELL CONSTRUCTION SCHEDULE (DEPTHS ARE FEET BELOW GRADE)

WELL ID	WELL TYPE	A	B	C	D	E	F	G	H	I	J
RW-1	GROUNDWATER EXTRACTION WELL	2.5	3.5	8	30	32	35	37	47	49	50
RW-2	GROUNDWATER EXTRACTION WELL	2.5	3.5	8	30	32	35	37	47	49	50
RW-3	GROUNDWATER EXTRACTION WELL	2.5	3.5	8	30	32	35	37	47	49	50

WELL CONSTRUCTION SPECIFICATIONS – GROUNDWATER EXTRACTION WELLS

WELL TYPE	WELL DIAMETER	SCREEN MATERIAL	SLOT SIZE	CASING MATERIAL	FILTER PACK	WELL SEAL	SURFACE COMPLETION
GROUNDWATER EXTRACTION WELL	8-INCH	STAINLESS STEEL WIRE-WRAPPED	40 SLOT	SCH. 80 PVC	MORIE #3	NEAT CEMENT	FLUSH MOUNT

CITY: DIV/GROUP: DB: LD: PIC: PM: TM: LYR:ON=*;OFF=*REF*
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XREFS: IMAGES: PROJECTNAME: --

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0	02/26/09	ISSUED FOR BID	RD	JF

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Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)
State: MO | Date Signed: | Project Mgr.: BO
Designed by: RD | Drawn by: AT | Checked by: JF

ARCADIS
ARCADIS U.S., INC.

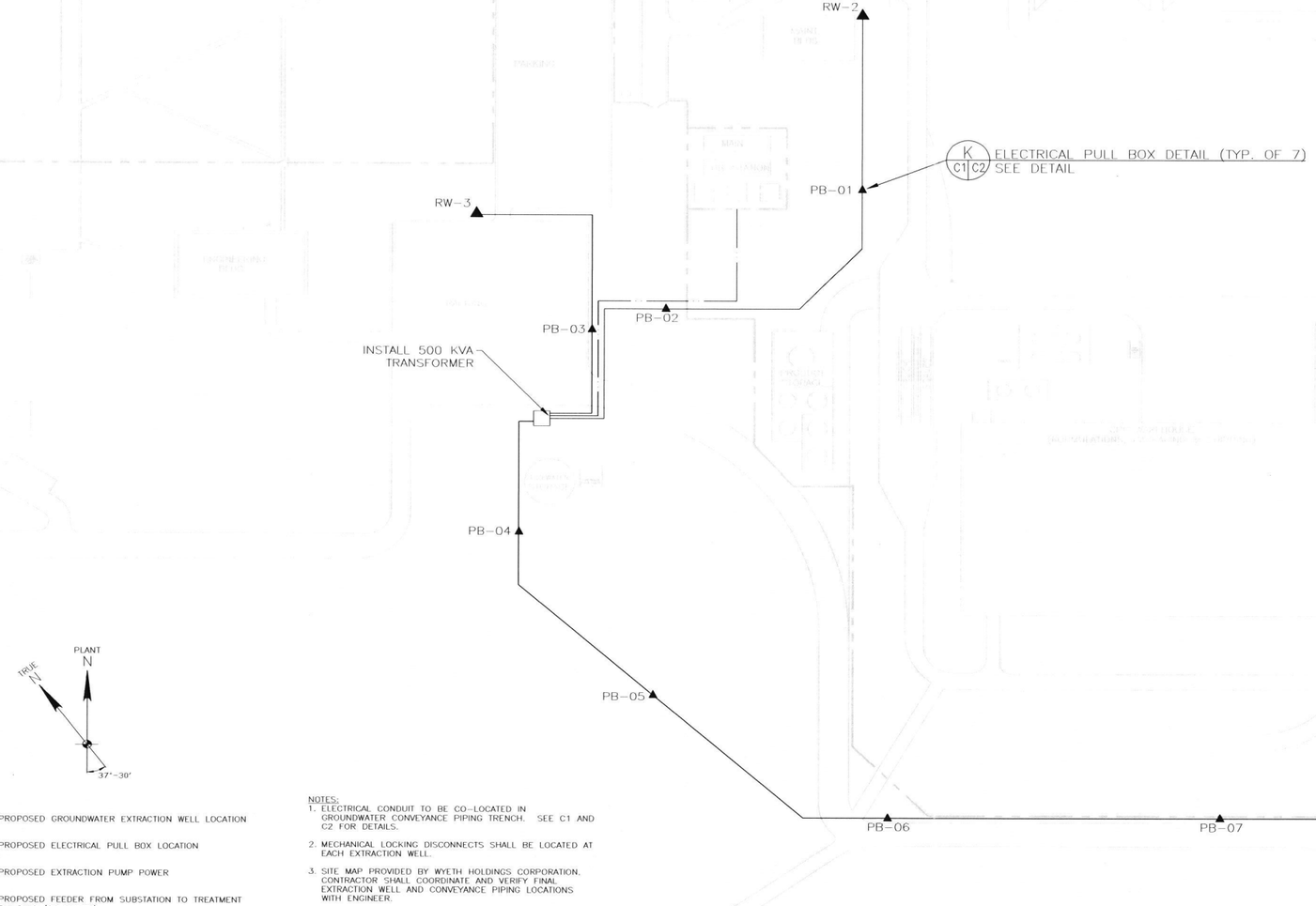
WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DOCUMENTS

EXTRACTION WELL AND VAULT CONSTRUCTION DETAILS

MECHANICAL

ARCADIS Project No. KC001566.0001.0150
Date FEBRUARY 26, 2009
ARCADIS U.S., INC. 8725 ROSEHILL SUITE 350 LENEXA, KANSAS TEL. 913.492.0900

M5



LEGEND

- RW-1 — PROPOSED GROUNDWATER EXTRACTION WELL LOCATION
- PB-01 — PROPOSED ELECTRICAL PULL BOX LOCATION
- PROPOSED EXTRACTION PUMP POWER
- PROPOSED FEEDER FROM SUBSTATION TO TREATMENT BUILDING (BY UTILITY)
- PROPOSED TREATMENT BUILDING LOCATION

NOTES:
1. ELECTRICAL CONDUIT TO BE CO-LOCATED IN GROUNDWATER CONVEYANCE PIPING TRENCH. SEE C1 AND C2 FOR DETAILS.
2. MECHANICAL LOCKING DISCONNECTS SHALL BE LOCATED AT EACH EXTRACTION WELL.
3. SITE MAP PROVIDED BY WYETH HOLDINGS CORPORATION. CONTRACTOR SHALL COORDINATE AND VERIFY FINAL EXTRACTION WELL AND CONVEYANCE PIPING LOCATIONS WITH ENGINEER.
4. CONTRACTOR TO RESTORE ALL SURFACES TO PRE-CONSTRUCTION CONDITIONS.
5. CONTRACTOR SHALL FURNISH AS-BUILT DRAWINGS WITH CERTIFIED SURVEY TO VERIFY ELEVATIONS AND LOCATIONS.

0 75 150 225
SCALE IN FEET

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	RD	JF

Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)

Designed by	Drawn by	Checked by
JS	JS	JF

State	Date Signed	Project Mgr.
MO		BO

ARCADIS
ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

ELECTRICAL SITE PLAN

ELECTRICAL

ARCADIS Project No.
KC001566.0001.0150

Date
FEBRUARY 26, 2009

ARCADIS U.S., INC.
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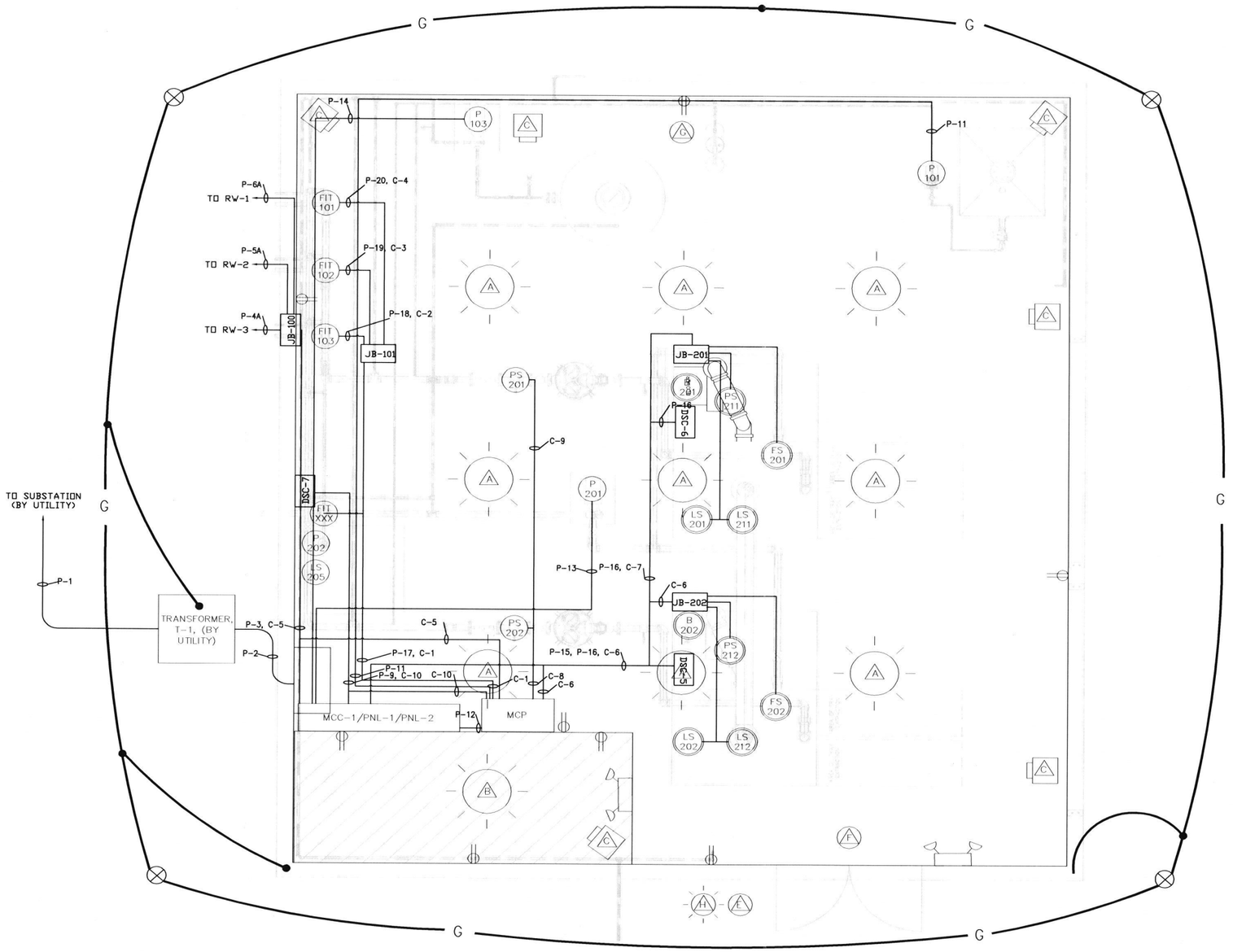
E1



DRAWING NOTES:

1. SEE DRAWING E-4 FOR CONDUIT/CONDUCTOR SCHEDULE, HVAC/LIGHTING SCHEDULE, AND PANEL PNL-2.

2. THE CONTRACTOR SHALL INSTALL A CABLE TRAY AROUND THE PERIMETER OF THE TREATMENT ROOM, FROM WHICH RIGID GALVANIZED CONDUIT DROPS SHALL ORIGINATE.

3. ELECTRICAL DRAWINGS ARE PARTIALLY DIAGRAMMATIC. REFER TO CIVIL, ARCHITECTURAL OR MECHANICAL DRAWINGS FOR GUIDANCE ON DIMENSIONS AND PRECISE LOCATIONS OF ELECTRICAL, INSTRUMENTATION OR CONTROL COMPONENTS. THE CONTRACTOR SHALL INSTALL THE ELECTRICAL SYSTEMS WITHOUT INTERFERING WITH THE DUCTS, PIPES, STRUCTURAL STEEL ETC. LIGHTING FIXTURES SHALL BE LOCATED SYMMETRICALLY IN PROPER RELATION TO FINISHED AREAS, EXCEPT WHERE DIMENTIONED DRAWINGS EXIST.

4. ALL CONDUITS ENTERING AND LEAVING SHEET METAL ENCLOSURES SHALL UTILIZE OIL-TIGHT CONDUIT HUBS FOR CONNECTION. HUBS SHALL BE MANUFACTURED BY THOMAS & BETTS, PANDUIT, OR APPROVED EQUIVALENT.

5. POWER, CONTROL AND INSTRUMENT UNDERGROUND FEEDS SHALL UTILIZE THE SAME TRENCH ROUTING AS THE WATER CONVEYANCE PIPES. ALL ELECTRICAL TRENCHES SHALL HAVE A MINIMUM OF 24" OF COVER, AND SHALL BE EQUIPPED WITH RED LOCATING/WARNING TAPE.

6. UNDERGROUND RACEWAYS SHALL BE OF PVC CONSTRUCTION, AND SHALL UTILIZE TPROCESS PIPING TRENCH AND ROUTING FOR INSTALLATION. CONDUITS SHALL MAINTAIN A MINIMUM OF 24" OF COVER AT ALL POINTS. ALL UNDERGROUND PVC CONDUIT SHALL TRANSITION TO RIGID GALVANIZED STEEL (R.G.S.) OR PVC-COATED R.G.S. AT LEAST 3 LINEAR FEET PRIOR TO PENETRATING UPWARD THROUGH GRADE.

7. CONTRACTOR SHALL INSTALL A GROUND LOOP CONSISTING OF STRANDED #2 AWG BARE COPPER CONDUCTOR, AND ¾" X 10' GROUND RODS AT THE CORNERS. THE GROUND LOOP SHALL BE BONDED TO THE UTILITY GROUND BUS, AND ATTACHED TO THE BUILDING STRUCTURAL STEEL IN AT LEAST 2 LOCATIONS. ALL CONNECTIONS SHALL BE EXOTHERMIC.

8. ALL CONDUITS SHALL BE ROUTED OVERHEAD, UNLESS WRITTEN AUTHORIZATION TO DO OTHERWISE IS RECEIVED FROM THE ENGINEER. NO CONDUITS SHALL BE ROUTED ON GRADE.

9. ALL CONDUIT CONNECTIONS TO MOTORS, SENSORS OR OTHER INSTRUMENTATION SHALL UTILIZE LIQUIDTIGHT FLEXIBLE CONDUIT. FLEXIBLE CONNECTIONS SHALL BE BETWEEN 18" AND 36" IN LENGTH.

10. THE CONTRACTOR SHALL PROVIDE PULL BOXES IF REQUIRED TO ALLOW PULLING OF ALL CABLES AND CONDUCTORS WITHOUT DAMAGE.

11. ALL JUNCTION BOXES SHALL BE EQUIPPED WITH TERMINAL STRIPS FOR INSTALLATION OF CONNECTIONS. WIRE-NUTTED CONNECTIONS SHALL NOT BE PERMITTED IN INSTRUMENT OR CONTROL JUNCTION BOXES.

12. DISCONNECT SWITCHES, WHERE NOT INDICATED ON EQUIPMENT SHALL BE PROVIDED WHERE REQUIRED BY THE NEC.

13. SECURELY AND ELECTICALLY BOND ALL NON-CURRENT-CARRYING METALLIC PARTS OF STRUCTURES, ELECTRICAL EQUIPMENT AND RACEWAYS TO THE GROUNDING SYSTEMS INDICATED.

SKID NOTES:

1. CONTROLS AND INSTRUMENTS DEPICTED ON SKID ARE PRE-WIRED FROM JUNCTION BOX. CONTRACTOR SHALL ROUTE CABLES AND MAKE TERMINATIONS AT THE JUNCTION BOX.

2. INSTRUMENT BUBBLES CONTAINING A DOUBLE-OUTLINE CONSTITUTE THOSE PROVIDED AS A PRE-WIRED, INTEGRATED SKID, BY OTHERS. THE CONTRACTOR WILL PROVIDED WIRING CONNECTIONS BETWEEN THE MCP AND THE APPROPRIATE JUNCTION BOX MOUNTED ON EACH SKID. THE CONTRACTOR IS NOT RESPONSIBLE FOR MOUNTING THE INSTRUMENTATION INDICATED BY THE DOUBLE-OUTLINE, OR FOR CONDUIT OR WIRING BETWEEN THE INSTRUMENT AND THE ASSOCIATED FIELD JUNCTION BOX.

CITY: DIV/GROUP: DB: LD: PIC: PM: TM: LYR:ON=*;OFF=*REF*
G:\PROJECTS\Wyeth\Design Drawings\Electrical\E2 - Electrical Layout.dwg LAYOUT: E2 SAVED: 6/23/2009 2:23 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: BLACKGRAY-THIN.CTB PLOTTED: 6/24/2009 10:49 AM BY: DORN, RYAN
XREFS: IMAGES: PROJECTNAME: ----

SCALE IN FEET: 0 2.5' 5' 7.5'

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No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	RD	JF

Professional Engineer's Name
ROYCE FACE
Professional Engineer's No.
(PE NUM)

State	Date Signed	Project Mgr.
MO		BO
Designed by	Drawn by	Checked by
JS	JS	JF

ARCADIS
ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

ELECTRIC LAYOUT

ELECTRICAL

ARCADIS Project No.
KC001566.0001.0150

Date
FEBRUARY 26, 2009

ARCADIS U.S., INC.
8725 ROSEHILL
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LENEXA, KANSAS
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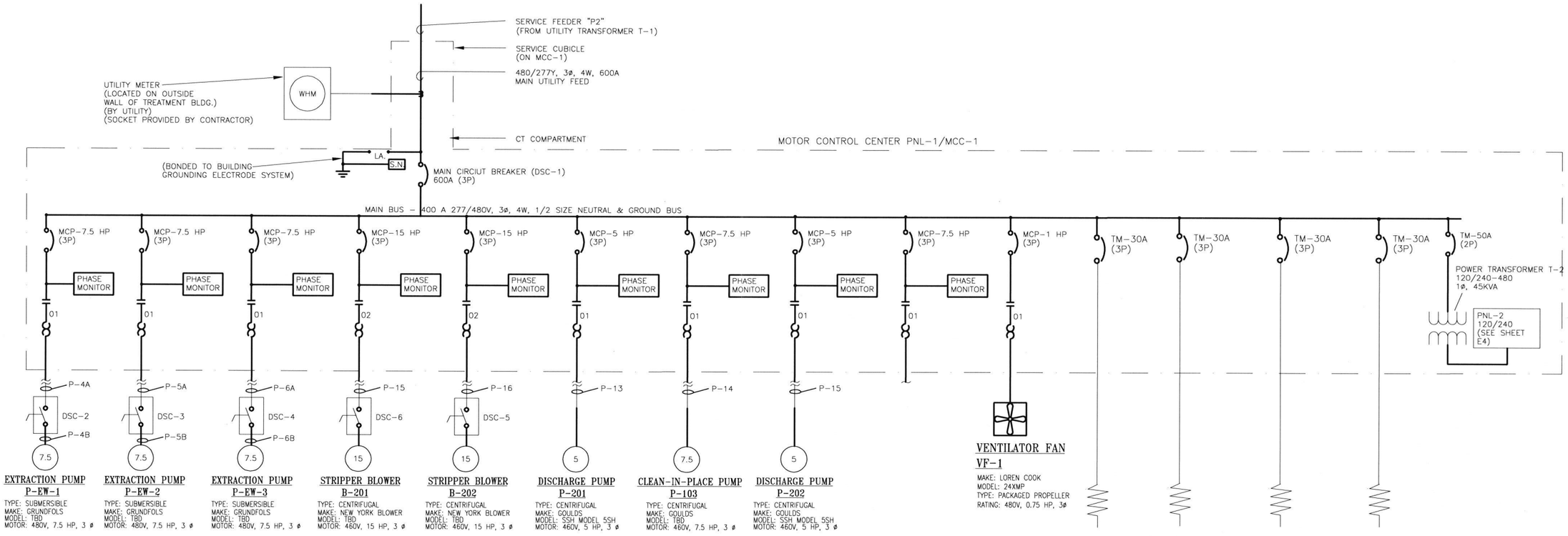
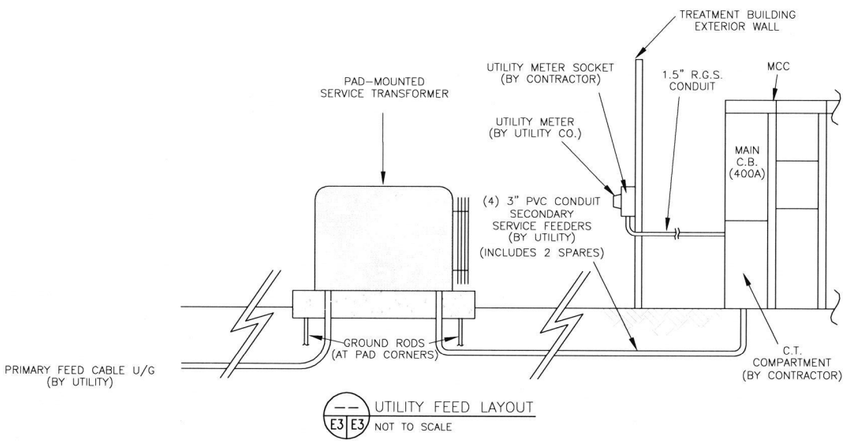
E2





UTILITY FEED LAYOUT
E3 E3 NOT TO SCALE

NOTES:

1. SEE DRAWING E2 FOR ELECTRICAL LAYOUT AND CONDUIT DETAIL.
2. SEE DRAWING E4 FOR SCHEDULES AND LEGEND.
3. RACEWAY ROUTING TO FIELD RECOVERY WELL LOCATIONS AND SUBSTATION SHALL FOLLOW PATH OF WATER PIPING, AND SHALL UTILIZE COMMON TRENCH.
4. MAIN POWER FEED SHALL BE TRANSMITTED VIA UNDERGROUND FEED FROM SUBSTATION (BY UTILITY).
5. ALL MATERIALS AND METHODS SHALL STRICTLY COMPLY WITH ALL APPLICABLE CLAYPOOL LOCAL, STATE AND FEDERAL BUILDING AND SAFETY CODES, INCLUDING THOSE PUBLISHED BY NFPA AND BOCA.
6. ALL CONDUIT SHALL BE INSTALLED OVERHEAD IN A NEAT, WORKMANLIKE MANNER. ACTUAL CONDUIT ROUTINGS SHALL BE FIELD-SPECIFIED, AND ALL SUPPORTING MEANS SHALL COMPLY WITH THE NEC. SHOULD ANY CONFLICT IN ROUTING OCCUR BETWEEN PROCESS AND ELECTRICAL PIPING, PREFERENCE SHALL GO TO PROCESS PIPING.
7. THE GROUNDING SYSTEM EQUIVALENT RESISTANCE SHALL NOT EXCEED 5 OHMS FOR THE SYSTEM UNDER NORMALLY DRY CONDITIONS. AFTER THE SYSTEM IS INSTALLED, THE CONTRACTOR SHALL PERFORM A GROUNDING RESISTANCE TEST. IF THE RESISTANCE TO EARTH OF THE GROUNDING SYSTEM EXCEEDS 5 OHMS, THE CONTRACTOR SHALL CORRECT THE PROBLEM AND RETEST THE GROUNDING ELECTRODE.
8. ALL CONDUCTORS SHALL BE THHN/THWN, AND UL LISTED. CONDUCTORS SHALL HAVE A MINIMUM SIZE AS SHOWN ON THE CONDUIT AND CONDUCTOR SCHEDULE, AND IN NO INSTANCE SHALL POWER CONDUCTORS BE OF A SIZE SMALLER THAN #12 AWG.

SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
1	05/2011	RECORD DRAWINGS	RD	RF
0	03/12/10	FOR REVIEW	RD	RF

Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)

State	Date Signed	Project Mgr.
MO		BO
Designed by: JS	Drawn by: JS	Checked by: JF

ARCADIS U.S., INC.

KOCH • SALINA, KANSAS
DESIGN / BID DRAWINGS

SINGLE LINE DIAGRAM

ELECTRICAL

ARCADIS Project No.: KC001588.0001.00002
Date: MAY 2011

ARCADIS U.S., INC.
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E3

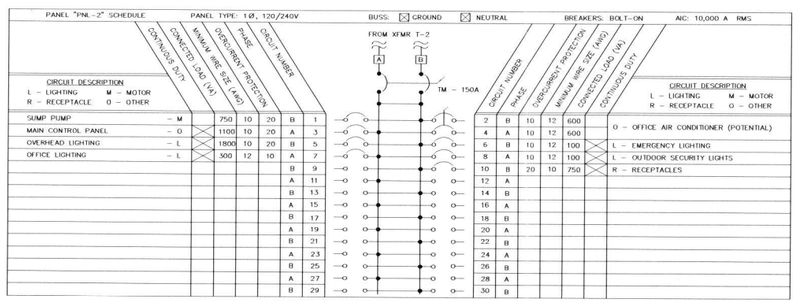
TREATMENT PLANT CONDUIT AND CONDUCTOR SCHEDULE

CONDUIT #	SIZE	CONDUIT TYPE	CONDUCTOR SIZE AND TYPE	PURPOSE	ORIGINATION	TERMINATION	COMMENTS
P-1	3"	PVC	BY UTILITY	MAIN POWER FEEDER	SUB-STATION	T-1	SUPPLIED BY UTILITY
P-2	3"	PVC/R.G.S.	(3)#500 MCM THHN, (1)#2 GND	MAIN POWER FEEDER	T-1	PNL-1	SUPPLIED BY UTILITY
P-3	2"		(3)#2 AWG. THHN, (3)#3 AWG. THHN, (3)#8 AWG. THHN, (3)#12 GND	P-EW-1, P-EW-2, P-EW-3 POWER	PNL-1	JB-100	
P-4A,B	2"	PVC	(3)#2 AWG. THHN, (1)#12 GND	P-EW-1 POWER	JB-100	RW-1	MOTOR STARTER IN MCC (PNL-1)
P-5A,B	2"	PVC	(3)#4 AWG. THHN, (1)#12 GND	P-EW-2 POWER	JB-100	RW-2	MOTOR STARTER IN MCC (PNL-1)
P-6A,B	2"	PVC	(3)#8 AWG. THHN, (1)#12 GND	P-EW-3 POWER	JB-100	RW-3	MOTOR STARTER IN MCC (PNL-1)
P-7	NA	NA	(3)#8 AWG. THHN, (1)#10 GND	T-1 FEEDER	PNL-1	T-1	LOCATED INSIDE MCC
P-8	NA	NA.	(3)#3 AWG. THHN, (1)#8 GND	PNL-2 FEEDER	T-2	PNL-2	LOCATED INSIDE MCC
P-9	0.75"	R.G.S.	(2)#10 AWG. THHN, (1)#12 GND	P-202 POWER	PNL-2	DSC-7	LOCAL DISCONNECT SWITCH WITH CONTACTOR, INTERLOCKED WITH LS-205. RUN SIGNAL FROM MCP
P-11	0.75"	R.G.S.	(2)#12 AWG. THHN, (1)#14 GND	P-101 POWER	MCP	P-101	POWER FROM MCP
P-12	0.75"	R.G.S.	(2)#10 AWG. THHN, (1)#12 GND	MCP POWER	PNL-2	MCP	
P-13	0.75"	R.G.S.	(3)#12 AWG. THHN, (1)#14 GND	P-201 POWER	PNL-1	P-201	LOCAL MOTOR STARTER
P-14	0.75"	R.G.S.	(3)#10 AWG. THHN, (1)#12 GND	P-103 POWER	PNL-1	P-103	LOCAL MOTOR STARTER
P-15	1"	R.G.S.	(3)#8 AWG. THHN, (2)#10 GND	B-202 POWER	PNL-1	DSC-5	MOTOR STARTER IN MCC (PNL-1)
P-16	1"	R.G.S.	(3)#8 AWG. THHN, (1)#10 GND	B-201 POWER	PNL-1	DSC-6	MOTOR STARTER IN MCC (PNL-1)
P-17	1"	R.G.S.	(8)#12 AWG. THHN, (4)#12 GND	FIT-XXX POWER, JB-101 HOME RUN	MCP	FIT-XXX, JB-100	UTILIZE PULL BOX FOR FIT-XXX TEE
P-18	1"	R.G.S.	(6)#12 AWG. THHN, (3)#12 GND	FIT-103 POWER	JB-101	FIT-103	
P-19	1"	R.G.S.	(4)#12 AWG. THHN, (2)#12 GND	FIT-102 POWER	JB-101	FIT-102	
P-20	1"	R.G.S.	(2)#12 AWG. THHN, (1)#12 GND	FIT-101 POWER	JB-101	FIT-101	
C-1	1"	R.G.S.	(4)#18 AWG. SHIELDED PAIR	FIT-XXX CONTROL, JB-101C HOME RUN	MCP	JB-101C	UTILIZE SEPARATE JUNCTION BOX JB-101-C FOR CONTROLS
C-2	1"	R.G.S.	(1)#18 AWG. SHIELDED PAIR	FIT-103 CONTROL	JB-101C	FIT-103	
C-3	1"	R.G.S.	(1)#18 AWG. SHIELDED PAIR	FIT-102 CONTROL	JB-101C	FIT-102	
C-4	1"	R.G.S.	(1)#18 AWG. SHIELDED PAIR	FIT-101 CONTROL	JB-101C	FIT-101	
C-5	1"	R.G.S.	(20)#12 AWG. THHN.	P-EW-1, P-EW-2, P-EW-3, B-201, B-202 RUN CONTROL AND RUN CONDITION	MCP	PNL-1	
C-5	1"	R.G.S.	(16)#12 AWG. THHN.	AS-201/AS-202 CONTROLS (LS-201, LS-202, FS-201, FS-202, PS-XXX, PS-XXX)	MCP	JB-202	
C-7	1"	R.G.S.	(8)#12 AWG. THHN.	AS-201/AS-2-2 CONTROLS (LS-201, FS-201, PS-XXX)	JB-202	JB-201	
C-8	0.75"	R.G.S.	(4)#12 AWG. THHN.	PS-201, PS-202 CONTROL	MCP	PS-202	UTILIZE PULL BOX FOR PS-202 TEE
C-9	0.75"	R.G.S.	(2)#12 AWG. THHN.	PS-201 CONTROL	PS-202	PS-201	
C-10	0.75"	R.G.S.	(4)#12 AWG. THHN.	LS-205, P-202 CONTROL	MCP	DSC-7	

NOTES:
1. CONDUIT AND CONDUCTOR SCHEDULE DOES NOT INCLUDE HVAC, LIGHTING OR RECEPTACLES.
2. JUNCTION BOXES SHALL BE INSTALLED AS NEEDED BY THE CONTRACTOR, SUBJECT TO DESIGN CONDITIONS IN THE ELECTRICAL NOTES ON SHEET E2.

HVAC AND LIGHTING SCHEDULE

Item	Description	Mounting	Distributor & Part Number	Quantity	Remarks	Misc.
A	Light Fixtures, Process Room	Ceiling	T.B.D.	9	120 VAC	
B	Light Fixture, Office	Ceiling	T.B.D.	1	120 VAC	
C	Heater, Process Room	Wall	T.B.D.	2	480 VAC, SEE SHEET H2	
D	Sensor, Photoelectric	Wall	T.B.D.	1	120 VAC	
E	Exit Sign, w/Emergency Lights	Wall	T.B.D.	1	120 VAC	
F	Exhaust fan w/ Louvers	Wall	T.B.D.	1	240 VAC	
G	Exterior Light	Roof	T.B.D.	1	120 VAC	



PANEL PNL-2 BREAKER SCHEDULE
SCALE: NOT TO SCALE

ELECTRICAL LEGEND

- CONDUIT RUN (EXPOSED)
- G — GROUND BUS OR WIRE, TYPE & SIZE AS SPECIFIED
- CONNECTION
- NO CONNECTION
- SEALTITE OR FLEXIBLE CONDUIT (AS DESCRIBED IN SPEC)
- GROUND CONNECTION
- GROUND ROD
- 02 — MOTOR STARTER, F.V.N.R. TYPE (NEMA SIZE 2)
- CIRCUIT BREAKER, AMPERE RATING AS SHOWN
- UNIT, PROCESS OR SPACE HEATER (AS DESC IN SPEC. (LAYOUT DRAWING)) (SEE HVAC & LTG. SCHED.)
- UNIT OR SPACE HEATER (SINGLE LINE DRAWING)
- 0.5 — INDUCTION MOTOR, SINGLE PHASE, # DENOTES H.P.
- THERMOSTAT
- LIGHTING FIXTURE (SEE HVAC & LTG. SCHED.)
- A-3 — DUPLEX RECEPTACLE (B-2 DENOTES PANEL "A" CIRCUIT #)
- CURRENT TRANSFORMER
- VFD — VARIABLE FREQUENCY DRIVE
- JB-_ — JUNCTION BOX
- WHM — WATTHOUR METER
- EMERGENCY LIGHTS
- LA — LIGHTNING ARRESTOR
- DISCONNECT (SWITCH) "DSC"
- TM THERMAL-MAGNETIC
- RGS RIGID GALVANIZED STEEL
- WP WEATHER PROOF
- C-X CONTROL CONDUIT
- P-X POWER CONDUIT (480 OR 120/240)
- M.C.P. MOTOR CIRCUIT PROTECTOR(S)
- MCP MAIN CONTROL PANEL
- AWG AMERICAN WIRE GAUGE
- PVC POLYVINYL CHLORIDE
- S.N. SERVICE NEUTRAL
- CKT CIRCUIT
- PNL PANEL

SCALE(S) AS INDICATED

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No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	RD	JF

Professional Engineer's Name: ROYCE FACE
Professional Engineer's No.: (PE NUM)
State: MO | Date Signed: | Project Mgr.: BO
Designed by: JS | Drawn by: JS | Checked by: JF

ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DRAWINGS

ELECTRIC SCHEDULES

ELECTRICAL

ARCADIS Project No. KC001566.0001.0150
Date FEBRUARY 26, 2009

ARCADIS U.S., INC.
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LENEXA, KANSAS
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E4

TREATMENT SYSTEM INTERLOCK DESCRIPTION

INSTRUMENT / EQUIPMENT ID	ALARM ID	ALARM LAMP	LATCHING	CONDITIONS	INTERLOCK DESCRIPTION	ADDITIONAL COMMENTS
FIT-101	FAL-101	YES	YES	P-EW-1 H-O-A SWITCH IS IN "HAND"	SWITCH P-EW-1 OFF	PLC SHALL LOG FLOWRATE AND FLOW TOTAL DATA FROM FIT-101
				FIT-101 VALUE IS BELOW OPERATOR ADJUSTABLE SETPOINT	TRIGGER P-EW-1 MOTOR FAULT	
FIT-102	FAL-102	YES	YES	P-EW-1 H-O-A SWITCH IS IN "HAND"	SWITCH P-EW-2 OFF	PLC SHALL LOG FLOWRATE AND FLOW TOTAL DATA FROM FIT-102
				FIT-102 VALUE IS BELOW OPERATOR ADJUSTABLE SETPOINT	TRIGGER P-EW-2 MOTOR FAULT	
FIT-103	FAL-103	YES	YES	P-EW-1 H-O-A SWITCH IS IN "HAND"	SWITCH P-EW-3 OFF	PLC SHALL LOG FLOWRATE AND FLOW TOTAL DATA FROM FIT-103
				FIT-103 VALUE IS BELOW OPERATOR ADJUSTABLE SETPOINT	TRIGGER P-EW-3 MOTOR FAULT	
FIT-XXX	N/A	YES	YES	NA	NA	PLC SHALL LOG FLOWRATE AND FLOW TOTAL DATA FROM FIT-XXX
LS-205	LAH-201	YES	YES	NORMALLY CLOSED SWITCH LS-201 IS OPEN	SWITCH P-202 ON	INDICATES A SPILL WITHIN THE BUILDING. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-1 OFF	
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
					SWITCH P-101 OFF	
					SWITCH P-102 OFF	
					SWITCH P-103 OFF	
LS-201	LAH-201	NO	NO	NORMALLY OPEN SWITCH LS-201 IS CLOSED	SWITCH P-201 ON	NORMAL PUMP CONTROL
	LAL-201	NO	NO	NORMALLY OPEN SWITCH LS-201 IS OPEN	SWITCH P-201 OFF	NORMAL PUMP CONTROL
LS-211	LAHH-201	YES	YES	NORMALLY CLOSED SWITCH LS-211 IS OPEN	SWITCH P-EW-1 OFF	INDICATES HIGH LEVEL IN AS-201 SUMP. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
LS-202	LAH-202	NO	NO	NORMALLY OPEN SWITCH LS-202 IS CLOSED	SWITCH P-201 ON	NORMAL PUMP CONTROL
	LAL-202	NO	NO	NORMALLY OPEN SWITCH LS-202 IS OPEN	SWITCH P-201 OFF	NORMAL PUMP CONTROL
LS-212	LAHH-202	YES	YES	NORMALLY CLOSED SWITCH LS-212 IS OPEN	SWITCH P-EW-1 OFF	INDICATES HIGH LEVEL IN AS-202 SUMP. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
PS-201	PAH-201	YES	YES	NORMALLY OPEN PRESSURE SWITCH PS-201 IS CLOSED	SWITCH P-EW-1 OFF	INDICATES HIGH PRESSURE UPSTREAM OF BAG FILTER. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
PS-202	PAH-202	YES	YES	NORMALLY OPEN PRESSURE SWITCH PS-202 IS CLOSED	SWITCH P-EW-1 OFF	INDICATES HIGH PRESSURE UPSTREAM OF BAG FILTER. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
PS-211	PAL-211	YES	YES	NORMALLY OPEN PRESSURE SWITCH IS OPEN	SWITCH B-201 OFF	INDICATES LOW PRESSURE DOWNSTREAM OF BLOWER B-201 / BLOWER FAILURE. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					TRIGGER B-201 MOTOR FAULT	
					SWITCH P-EW-1 OFF	
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
PS-211	PAL-211	YES	YES	NORMALLY OPEN PRESSURE SWITCH IS OPEN	SWITCH B-201 OFF	INDICATES LOW PRESSURE DOWNSTREAM OF BLOWER B-202 / BLOWER FAILURE. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					TRIGGER B-201 MOTOR FAULT	
					SWITCH P-EW-1 OFF	
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
FS-201	FAL-201	NO	NO	THERE IS NO FLOW INTO AS-201	NA	INDICATOR ONLY
FS-202	FAL-202	NO	NO	THERE IS NO FLOW INTO AS-202	NA	INDICATOR ONLY

TREATMENT SYSTEM INTERLOCK DESCRIPTION

INSTRUMENT / EQUIPMENT ID	ALARM ID	ALARM LAMP	LATCHING	CONDITIONS	INTERLOCK DESCRIPTION	ADDITIONAL COMMENTS
N/A	POWER FAILURE	YES	YES	EXTERNAL POWER TO THE SYSTEM IS LOST	SWITCH P-EW-1 OFF	INDICATES POWER LOSS. FULL SYSTEM SHUTDOWN TO PREVENT AUTOMATIC RE-START IN UNFAVORABLE CONDITIONS. MANUAL RESET REQUIRED. P-202 IS LEFT IN AUTO AS A SAFETY MEASURE. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
					SWITCH P-101 OFF	
					SWITCH P-102 OFF	
					SWITCH P-103 OFF	
					SWITCH B-101 OFF	
					SWITCH B-102 OFF	
P-101	MOTOR FAULT	YES	YES	P-101 IS CALLED TO RUN BY THE MCP	SWITCH P-EW-1 OFF	FULL SYSTEM SHUTDOWN TO PREVENT OPERATION IN UNKNOWN CONDITIONS. MANUAL RESET REQUIRED. B-101 AND B-102 ARE LEFT IN AUTO TO CONTINUE TREATMENT OF WATER IN AIR STRIPPER. P-202 IS LEFT IN AUTO AS A SAFETY MEASURE. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
				NORMALLY OPEN P-101 RUN CONDITION IS OPEN	SWITCH P-101 OFF	
					SWITCH P-102 OFF	
					SWITCH P-103 OFF	
P-103	MOTOR FAULT	YES	YES	P-103 IS CALLED TO RUN BY THE MCP	SWITCH P-EW-1 OFF	FULL SYSTEM SHUTDOWN TO PREVENT OPERATION IN UNKNOWN CONDITIONS. MANUAL RESET REQUIRED. B-101 AND B-102 ARE LEFT IN AUTO TO CONTINUE TREATMENT OF WATER IN AIR STRIPPER. P-202 IS LEFT IN AUTO AS A SAFETY MEASURE. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
				NORMALLY OPEN P-103 RUN CONDITION IS OPEN	SWITCH P-101 OFF	
					SWITCH P-102 OFF	
					SWITCH P-103 OFF	
P-201	MOTOR FAULT	YES	YES	P-201 IS CALLED TO RUN BY THE MCP	SWITCH P-EW-1 OFF	FULL SYSTEM SHUTDOWN TO PREVENT OPERATION IN UNKNOWN CONDITIONS. MANUAL RESET REQUIRED. B-101 AND B-102 ARE LEFT IN AUTO TO CONTINUE TREATMENT OF WATER IN AIR STRIPPER. P-202 IS LEFT IN AUTO AS A SAFETY MEASURE. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
				NORMALLY OPEN P-201 RUN CONDITION IS OPEN	SWITCH P-101 OFF	
					SWITCH P-102 OFF	
					SWITCH P-103 OFF	
P-EW-1	MOTOR FAULT	YES	YES	P-EW-1 IS CALLED TO RUN BY THE MCP	SWITCH P-EW-1 OFF	FULL SYSTEM SHUTDOWN TO PREVENT OPERATION IN UNKNOWN CONDITIONS. MANUAL RESET REQUIRED. B-101 AND B-102 ARE LEFT IN AUTO TO CONTINUE TREATMENT OF WATER IN AIR STRIPPER. P-202 IS LEFT IN AUTO AS A SAFETY MEASURE. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
				NORMALLY OPEN P-EW-1 RUN CONDITION IS OPEN	SWITCH P-101 OFF	
					SWITCH P-102 OFF	
					SWITCH P-103 OFF	
P-EW-2	MOTOR FAULT	YES	YES	P-EW-2 IS CALLED TO RUN BY THE MCP	SWITCH P-EW-1 OFF	FULL SYSTEM SHUTDOWN TO PREVENT OPERATION IN UNKNOWN CONDITIONS. MANUAL RESET REQUIRED. B-101 AND B-102 ARE LEFT IN AUTO TO CONTINUE TREATMENT OF WATER IN AIR STRIPPER. P-202 IS LEFT IN AUTO AS A SAFETY MEASURE. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
				NORMALLY OPEN P-EW-2 RUN CONDITION IS OPEN	SWITCH P-101 OFF	
					SWITCH P-102 OFF	
					SWITCH P-103 OFF	
P-EW-3	MOTOR FAULT	YES	YES	P-EW-3 IS CALLED TO RUN BY THE MCP	SWITCH P-EW-1 OFF	FULL SYSTEM SHUTDOWN TO PREVENT OPERATION IN UNKNOWN CONDITIONS. MANUAL RESET REQUIRED. B-101 AND B-102 ARE LEFT IN AUTO TO CONTINUE TREATMENT OF WATER IN AIR STRIPPER. P-202 IS LEFT IN AUTO AS A SAFETY MEASURE. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
				NORMALLY OPEN P-EW-3 RUN CONDITION IS OPEN	SWITCH P-101 OFF	
					SWITCH P-102 OFF	
					SWITCH P-103 OFF	
B-101	MOTOR FAULT	YES	YES	B-101 IS CALLED TO RUN BY THE MCP	SWITCH P-EW-1 OFF	FULL SYSTEM SHUTDOWN TO PREVENT OPERATION IN UNKNOWN CONDITIONS. MANUAL RESET REQUIRED. B-102 IS LEFT IN AUTO TO CONTINUE TREATMENT OF WATER IN AIR STRIPPER. P-202 IS LEFT IN AUTO AS A SAFETY MEASURE. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
				NORMALLY OPEN B-101 RUN CONDITION IS OPEN	SWITCH P-101 OFF	
					SWITCH P-102 OFF	
					SWITCH P-103 OFF	
					SWITCH B-101 OFF	
B-102	MOTOR FAULT	YES	YES	B-102 IS CALLED TO RUN BY THE MCP	SWITCH P-EW-1 OFF	FULL SYSTEM SHUTDOWN TO PREVENT OPERATION IN UNKNOWN CONDITIONS. MANUAL RESET REQUIRED. B-101 IS LEFT IN AUTO TO CONTINUE TREATMENT OF WATER IN AIR STRIPPER. P-202 IS LEFT IN AUTO AS A SAFETY MEASURE. INDIVIDUAL COMPONENTS STILL WORK IN HAND.
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
				NORMALLY OPEN B-102 RUN CONDITION IS OPEN	SWITCH P-101 OFF	
					SWITCH P-102 OFF	
					SWITCH P-103 OFF	
					SWITCH B-102 OFF	
NA	EMERGENCY STOP	YES	YES	EMERGENCY STOP BUTTON IS DEPRESSED	SWITCH P-EW-1 OFF	FULL SYSTEM SHUTDOWN, INDIVIDUAL COMPONENTS WILL NOT WORK IN HAND
					SWITCH P-EW-2 OFF	
					SWITCH P-EW-3 OFF	
					SWITCH P-101 OFF	
					SWITCH P-102 OFF	
					SWITCH P-103 OFF	
					SWITCH B-101 OFF	
					SWITCH B-102 OFF	
					SWITCH P-202 OFF	

SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING. USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
0	02/26/09	ISSUED FOR BID	RD	JF

Professional Engineer's Name: **ROYCE FACE**
Professional Engineer's No.: (PE NUM)
State: MO | Date Signed: | Project Mgr.: BO
Designed by: JS | Drawn by: JS | Checked by: JF

ARCADIS
ARCADIS U.S., INC.

WYETH HOLDINGS CORPORATION • HANNIBAL, MISSOURI
DESIGN / BID DOCUMENTS

LOGIC DESCRIPTION

ELECTRICAL

ARCADIS Project No.
KC001566.0001.0150

Date
FEBRUARY 26, 2009

ARCADIS U.S., INC.
8725 ROSEHILL
SUITE 350
LENEXA, KANSAS
TEL. 913.492.0900

E5

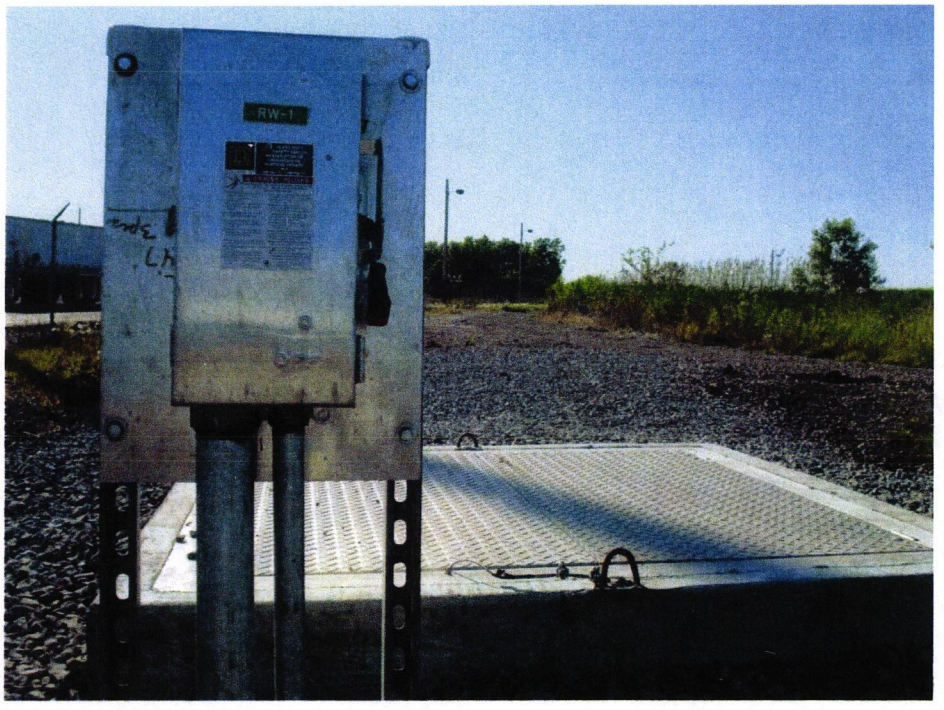
ARCADIS

Appendix **B**

Construction Photographic Log

ARCADIS

Project Photographs
Construction
Completion Report
Agricultural Products
Division Facility
Hannibal, Missouri

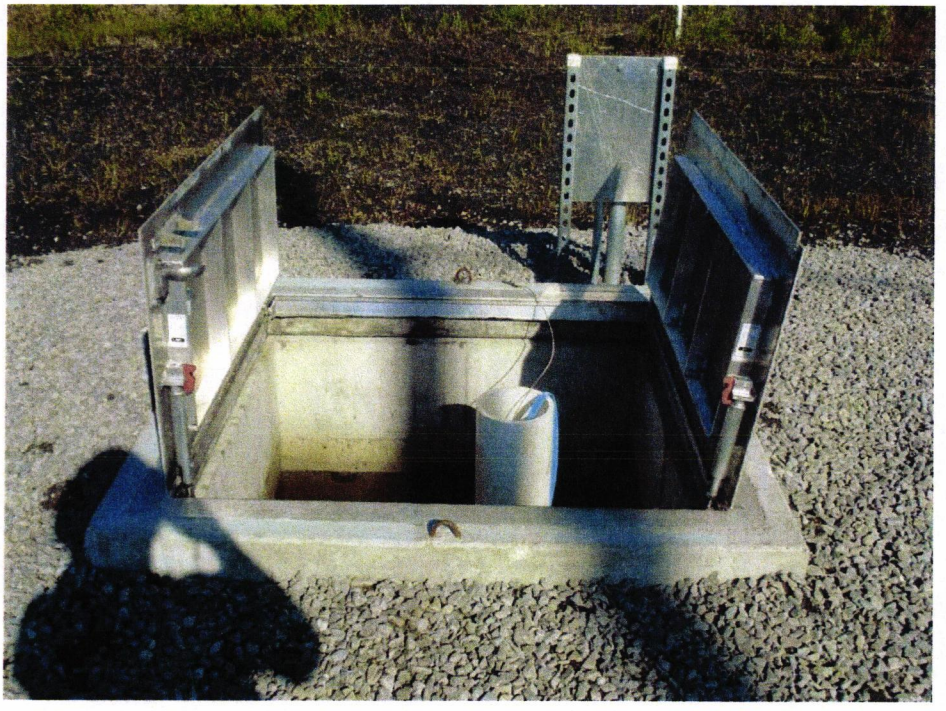


1
Electrical pull box at RW-1.

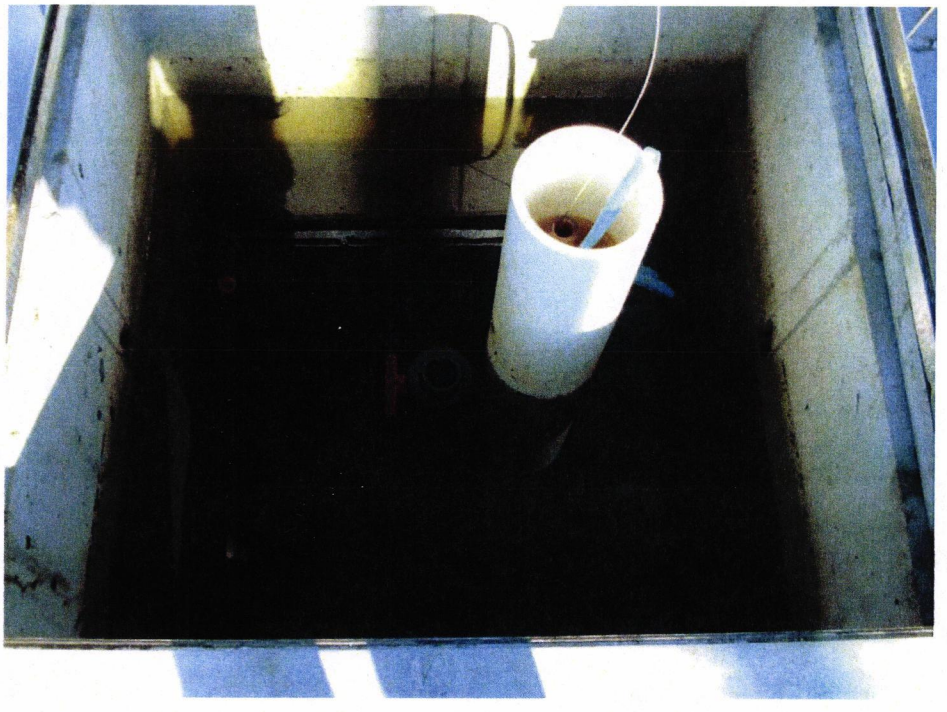
2
RW-1 vault and electrical pull pox

ARCADIS

Project Photographs
Construction
Completion Report
Agricultural Products
Division Facility
Hannibal, Missouri



3
RW-1 Vault



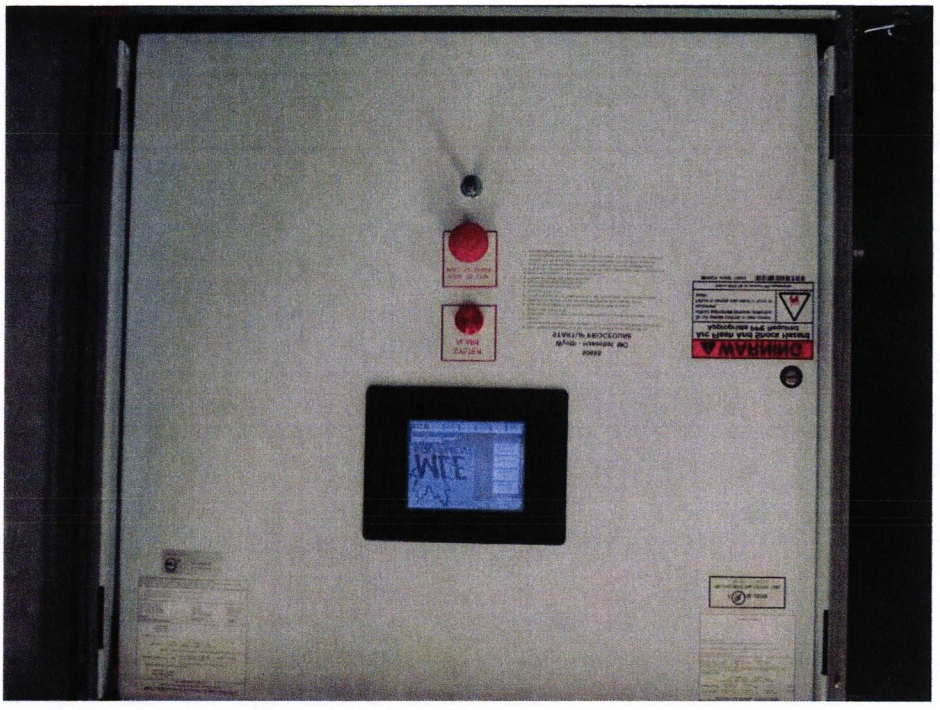
4
Interior view of RW-1 vault

ARCADIS

Project Photographs
Construction
Completion Report
Agricultural Products
Division Facility
Hannibal, Missouri

5
Treatment building doors

6
Treatment building

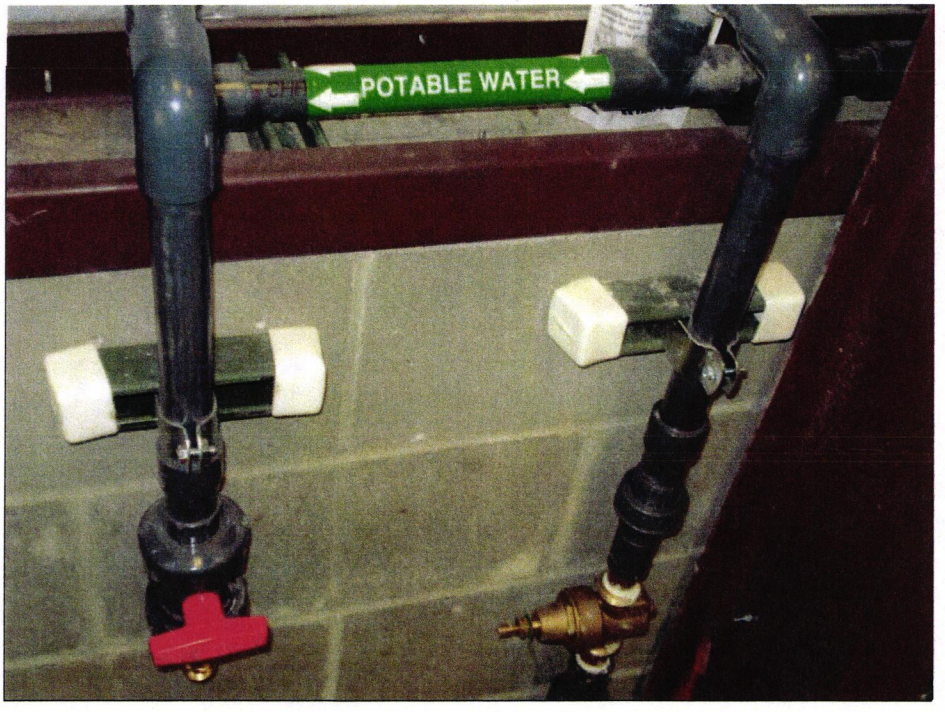


7
PLC control panel

8
Circuit breaker panel

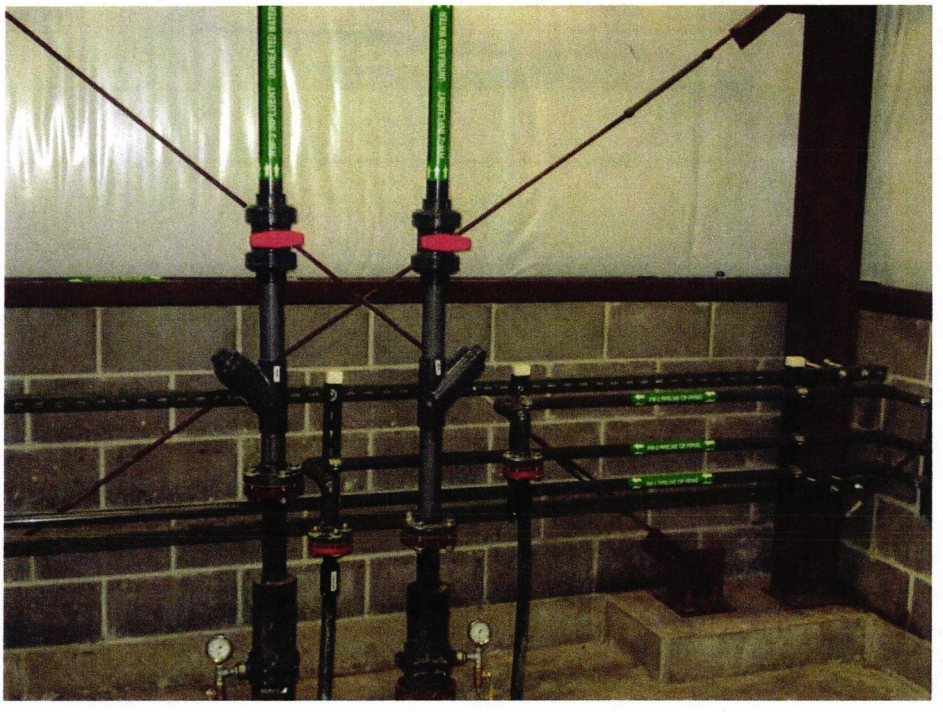
9
Electrical breaker box

10
Heater thermostat



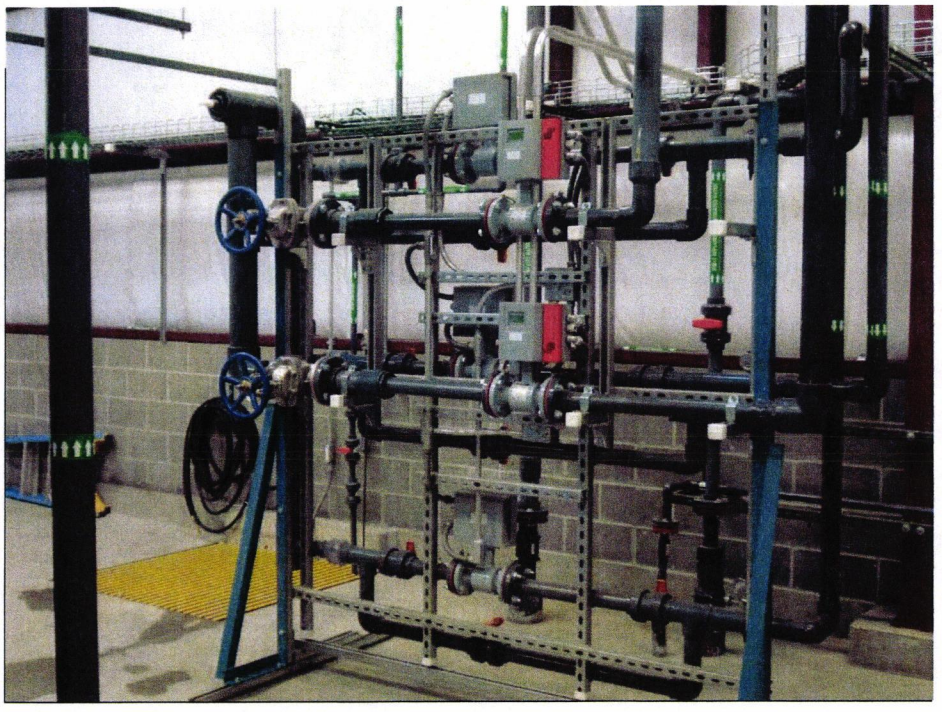
11
Potable water supply and hose bib

12
Floor sump



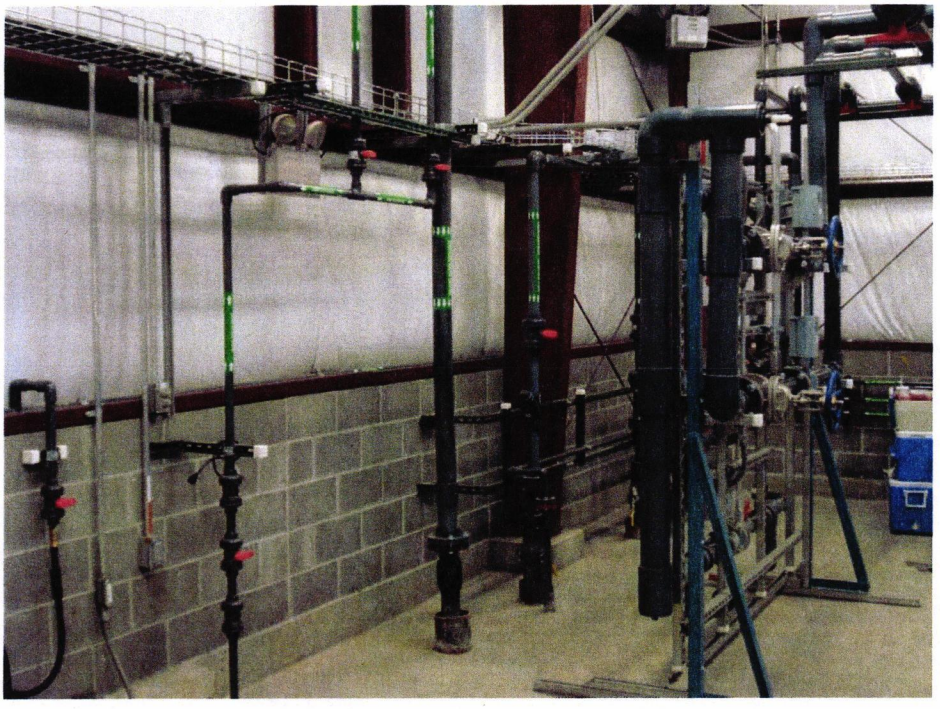
13
Piping where recovery well enter building

14
Piping manifold with recovery well flow meters and regulating valves



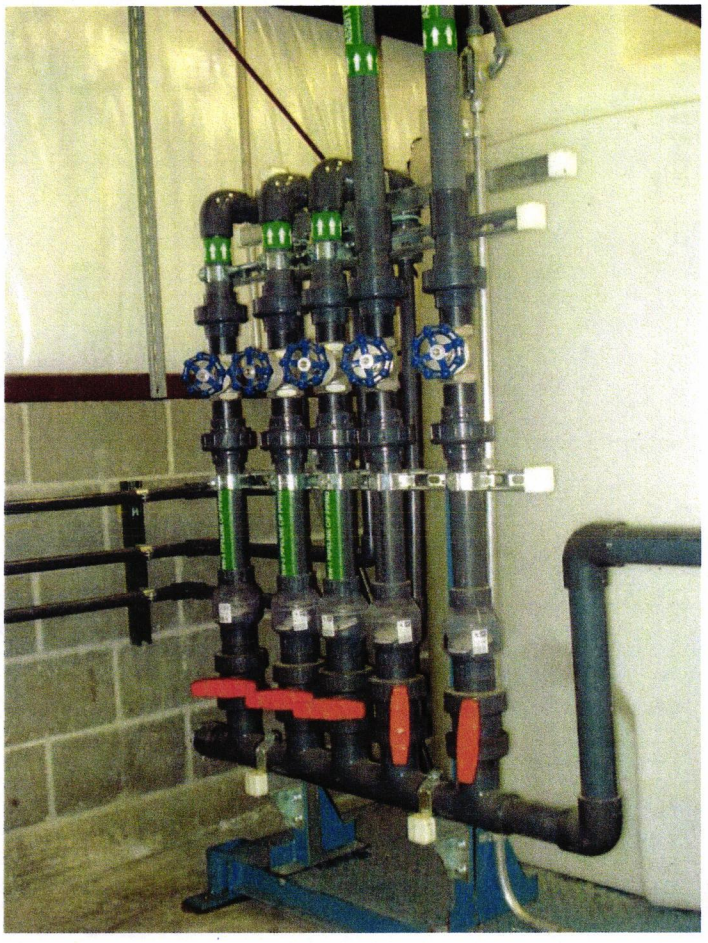
15

Manifold that splits flow to each air stripper, with flow meters and control valves

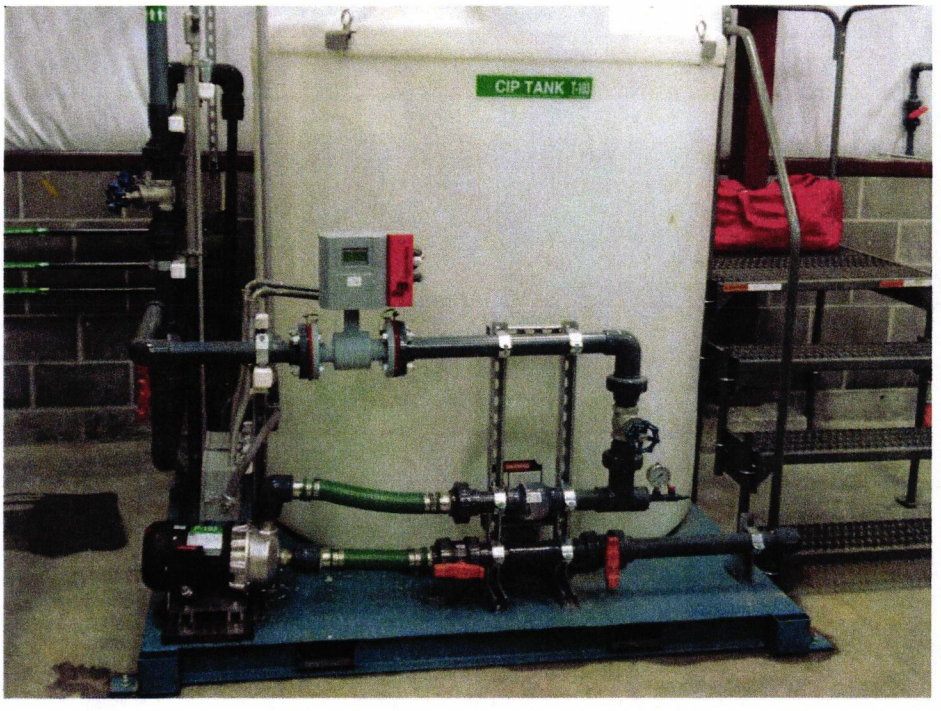


16

Outfall piping through floor



17
Clean-in-place piping header and control valves



18
Clean-in-place tank and pump

19
Safety Shower

20
Air stripper 2

21
Air stripper 2 and blower equipment

22
Treatment building door and louvered vent

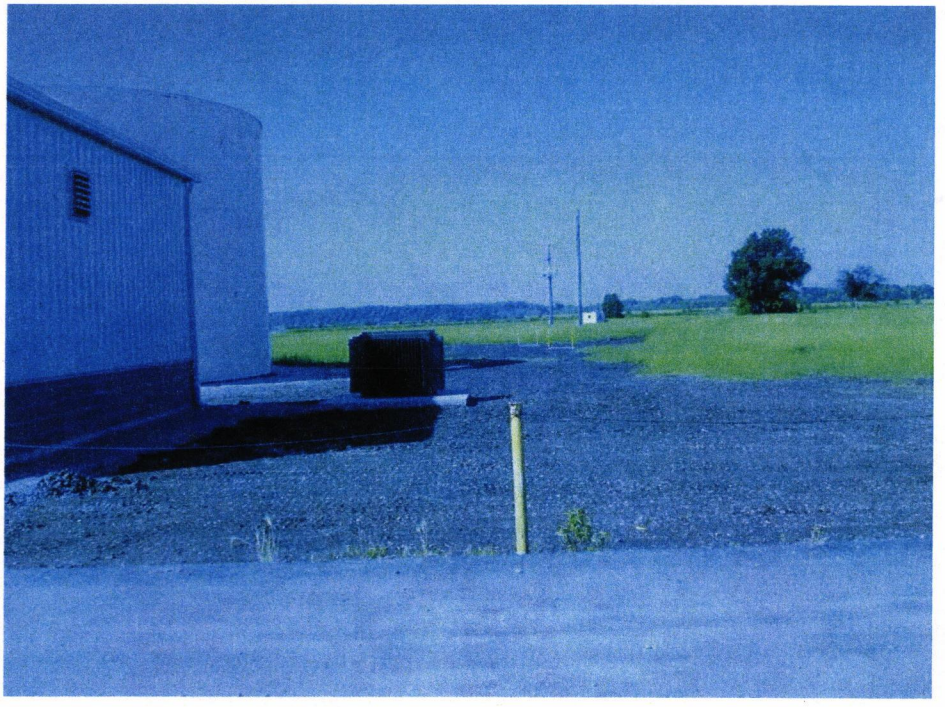
23
West side of treatment building

24
Piping cleanout, showing bollards

25
Trenching toward outfall

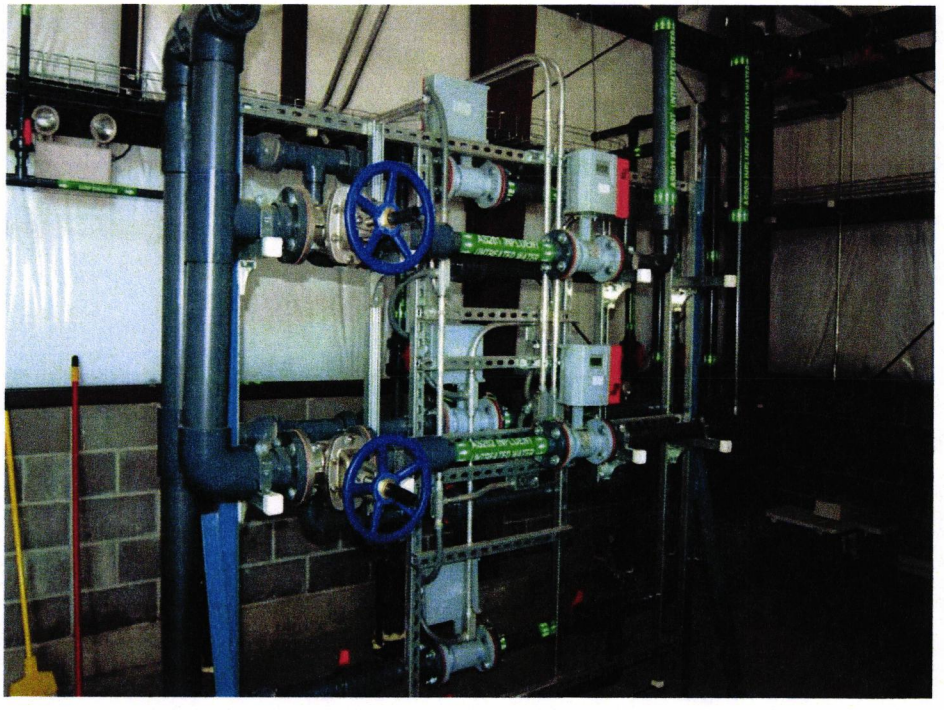
26
Outfall at ditch south of treatment building

27
Outfall, showing riprap



28
West side of treatment building, showing electrical transformer

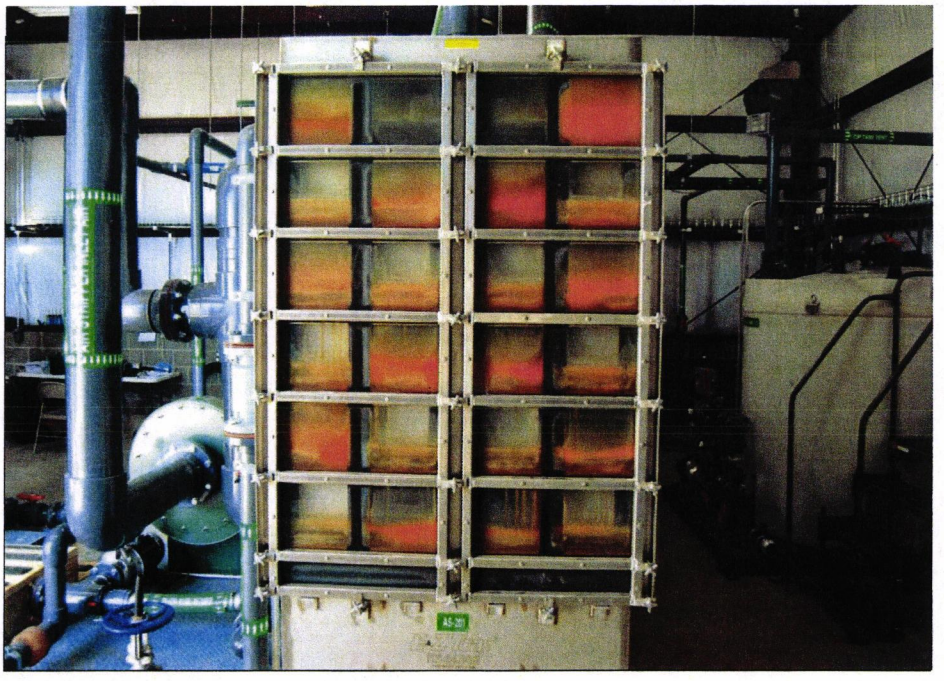
29
View of graded trench north of treatment building



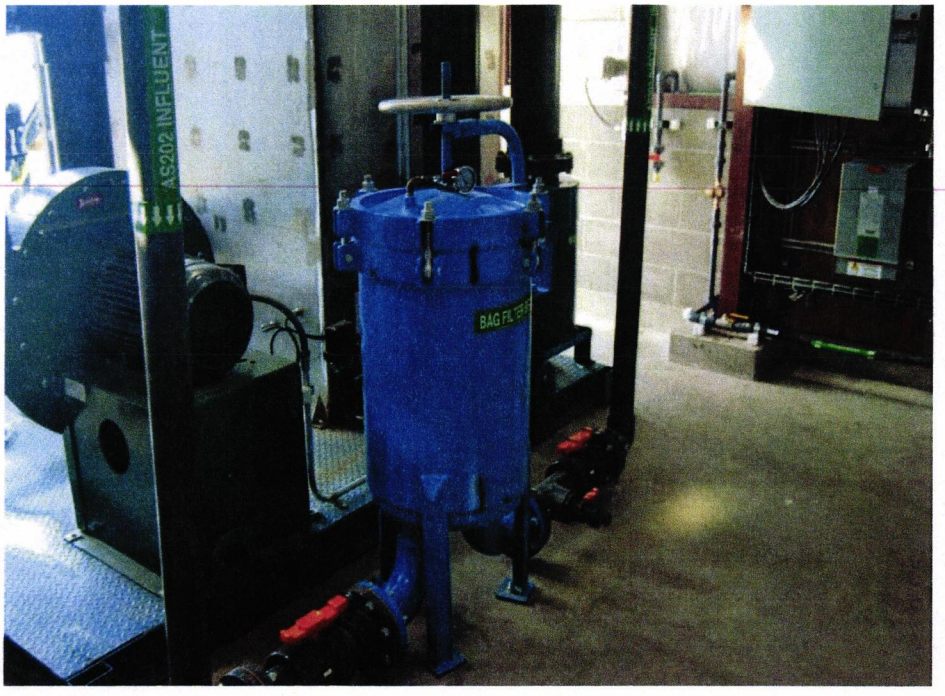
30
Flow splitting header, showing flow meters and control valves

31
Access steps to clean-in-place tank

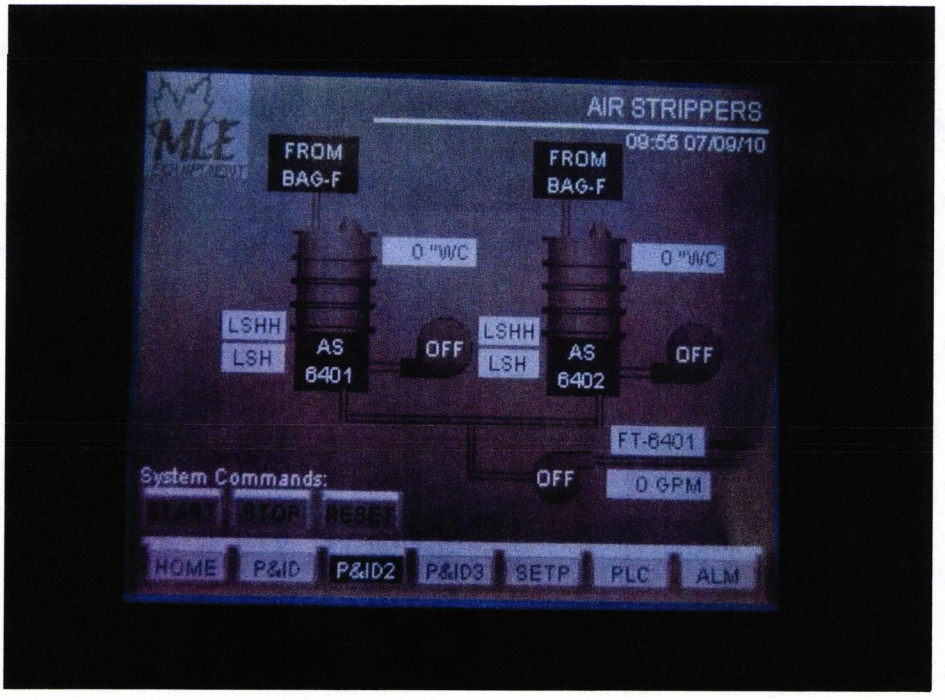
32
Air stripper 1



33
Air stripper 1

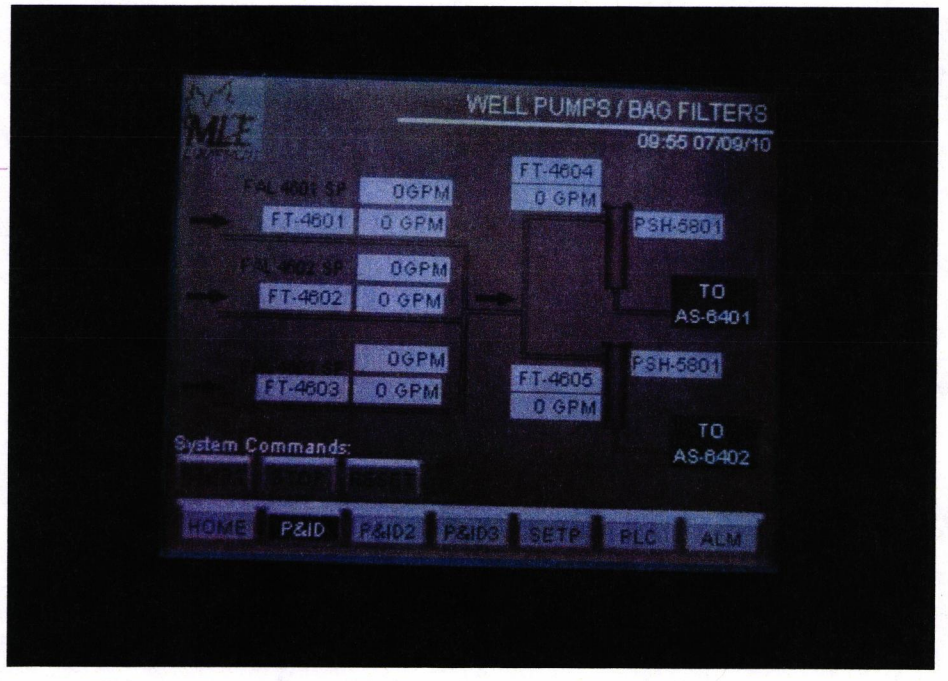


34
Bag filter prior to air stripper 2



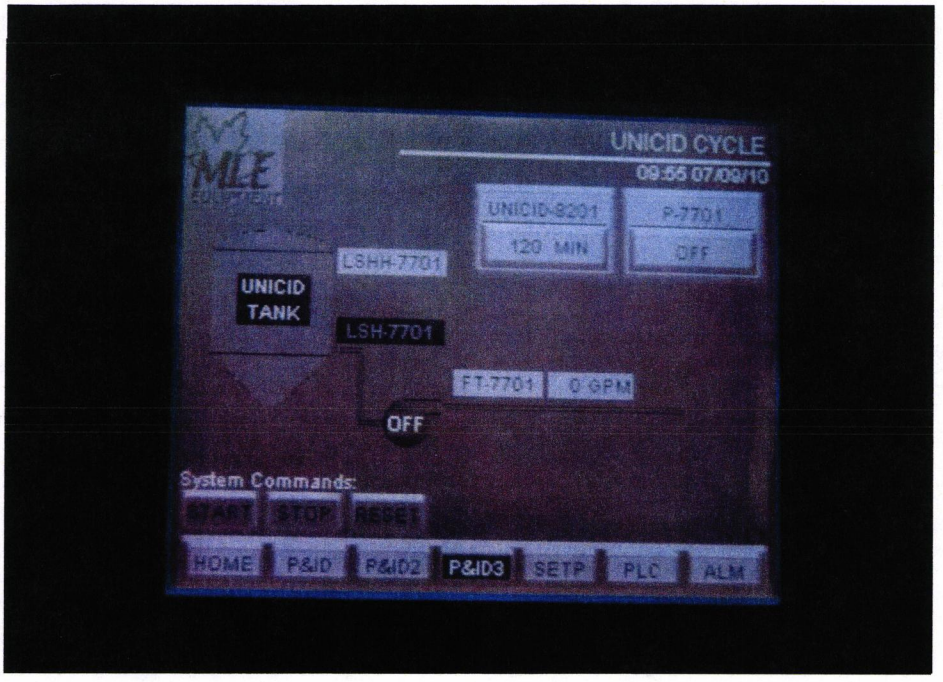
35

Monitoring Screen, showing sump levels and blower pressure



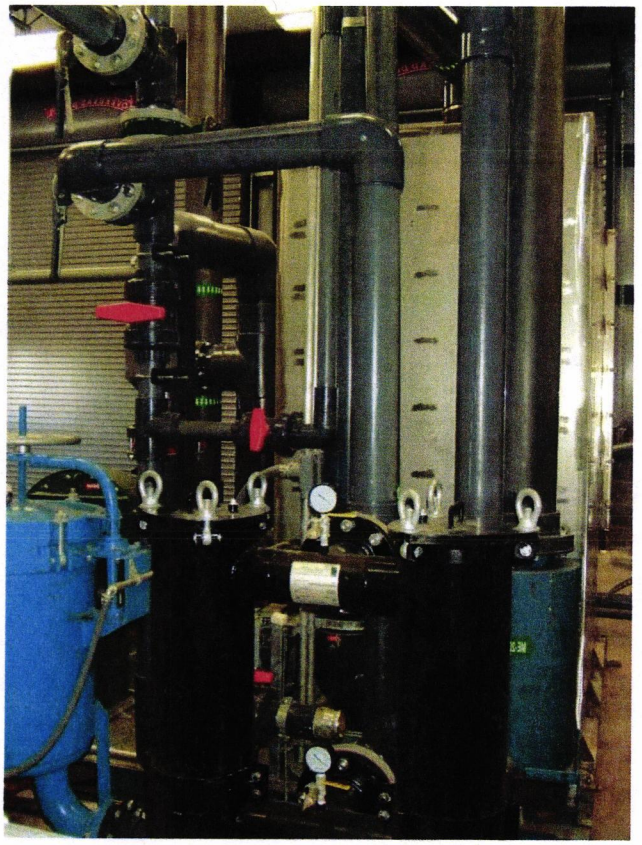
36

Monitor screen, showing recovery pump flows



37
Monitor screen, showing clean-in-place equipment

38
Blower and bag filter for air stripper 1



39

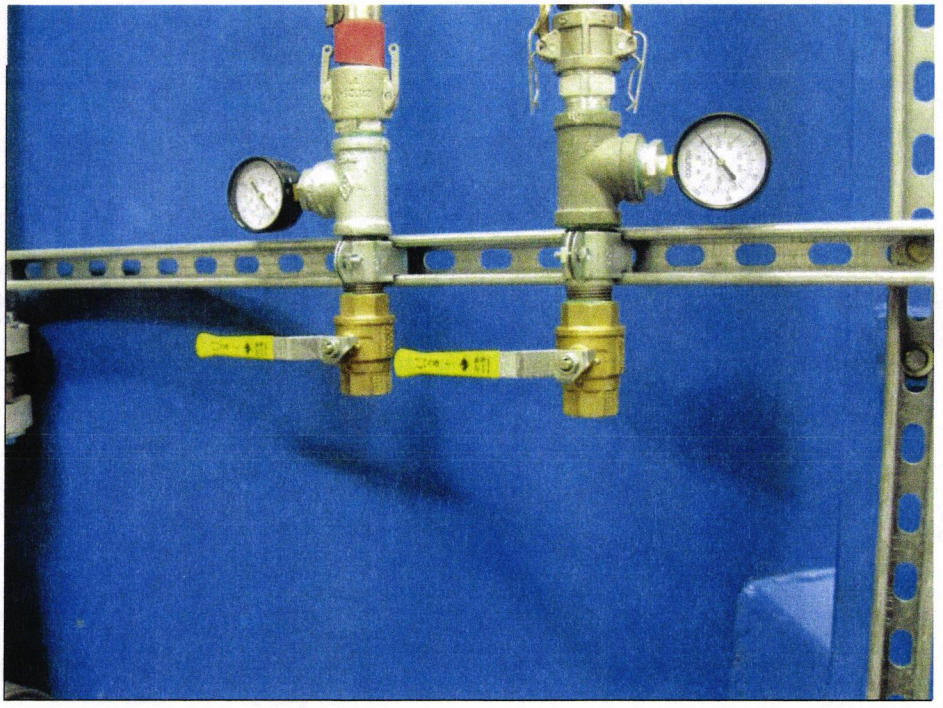
Bag filters prior to GAC treatment

40

Portion of GAC header, showing slip-stream piping for Inficon GC

41
GAC piping header

42
GAC vessels



43
"burp lines" to remove air from GAC vessels

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Appendix **C**

As-Built Survey – Piping and Primary Structures

SKETCH OF SURVEY

WATER EXTRACTION SYSTEM AT HANNIBAL BASF PLANT
MARION COUNTY, MISSOURI

(AS MADE FOR USA ENVIRONMENT, LP)

DESC	NORTHING	EASTING	ELEV.
MON #3	8629.88	4900.03	468.57
MON #4	8566.43	4445.30	470.11
MON #5	8409.58	6307.75	470.19
MON #6	8778.28	7235.35	469.38
CEN. RW-1	7775.732	6726.574	
CEN. RW-2 WELL PIT	8785.802	6074.348	
CEN. RW-3 WELL PIT	8563.975	5619.177	
NW COR. BUILDING	8314.801	5694.170	
SW COR. BUILDING	8277.227	5694.547	
SE COR. BUILDING	8277.949	5728.566	
NE COR. BUILDING	8315.523	5728.189	
CEN. TRANSFORMER PAD	8282.848	5680.292	
POWER POLE	7757.726	5362.907	
CO-02	8565.886	6076.216	
CO-03	8455.717	5814.428	
CO-05	8437.857	5814.065	
CO-07	7789.283	6496.760	
CO-08	7787.148	6102.042	
CO-09	7963.969	5857.273	
CO-10	8129.717	5660.383	
PB-01	8540.050	6071.417	
PB-02	8443.348	5819.999	
PB-03	8437.942	5820.448	
PB-04	8034.424	5766.548	
PB-05	7893.446	5978.183	
PB-06	7789.574	6176.546	
PB-07	7791.990	6443.953	
WATER METER	8100.362	5666.332	
END OUTFALL PIPE	7528.588	5504.499	
"4" PVC CLEANOUT	8438.748	5872.313	

COORDINATES AS PER ORIGINAL PLANT COORDINATES

BRASS MON. MECO #3
BRASS MON. MECO #4
BRASS MON. MECO #5
BRASS MON. MECO #6
CENTER 5'X5' WELL PIT RW-2
CENTER 5'X5' WELL PIT RW-3
CENTER OF WELL RW-1
STEEL PROTECTION POST
ELEC. CONTROL PANEL
ELEC. CONTROL PANEL
ELEC. CONTROL PANEL
ELEC. TRANSFORMER CONC. PAD
TREATMENT BUILDING
4" PVC CLEANOUT
WATER METER
OUTFALL PIPE
END 6" HDPE
WITH FLARED END SECTION
CO-02
PB-01
CO-03
PB-02
CO-05
PB-03
CO-10
PB-04
CO-09
PB-05
CO-08
PB-06
PB-07
CO-07
UE
EC

N92+00
N90+00
N88+00
N86+00
N84+00
N82+00
N80+00
N78+00
N76+00
E52+00
E54+00
E56+00
E58+00
E60+00
E62+00
E64+00
E66+00
E68+00
E70+00
E72+00
E74+00

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)

1 inch = 200 ft.

PLANT NORTH

Legend

- Monument
- Cleanout
- Electric Pull Box
- UE — Underground Electric
- Power Pole
- Guy Wire
- Piping Trenches

THIS IS A RESULT OF MY SURVEY AS PREPARED UNDER MY DIRECT SUPERVISION DURING AUGUST. 2010, WHICH I CERTIFY TO BE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Kevin L. Bock 12/1/10

KEVIN L. BOCK, PLS 2008000714

STATE OF MISSOURI
KEVIN L. BOCK
NUMBER PLS-2008000714
PROFESSIONAL LAND SURVEYOR

MECO ENGINEERING COMPANY, INC.
ENGINEERS • SURVEYORS
3120 HIGHWAY W
HANNIBAL, MISSOURI 63401
(573) 221-4048
MISSOURI SURVEY LICENSE #000186

DRAWN	CHECKED
KB	KB

Fd. Bk. – 1059A
Pg. – 39

DRAWING NAME
102236

PROJECT NO.
102-236

ARCADIS

Appendix **D**

Recovery Well Completion Logs

ARCADIS

Sample/Core Log

Boring/Well: RW-1 | Project/No.: KC001589.0001.0101 | Page: 1 of 2

Site Location: Hannibal - Northeast corner of Richland Bldg | Drilling Started: 1500 12/6/2009 | Drilling Completed: 1500 12/7/2009

Total Depth Drilled: 52 Feet | Hole Diamete: 12 inches | Type of Sample/ Coring Device: Continuous

Length and Diameter of Coring Device: 10 feet by 7 inches | Sampling Interval: 10 feet

Land-Surface Elev.: 467 feet | [ ] Surveyed | [X] Estimated | Datum: Ground

Drilling Fluid Used: Plant Potable Water | Drilling Method: Rotosonic

Drilling Contractor: Boart Longyear | Driller: Darren Kern | Helper: Jerry Beardmore

Prepared By: Larry Benolkin | Hammer Weight: NA | Hammer Drop: NA ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
Surface	5	0	NA	Air-knifed to clear utilities - Not recovered
5	7	2.2	NA	CL -CLAY, very dark grey 10YR(3/1), stiff, medium plastic, some dark yellowish
				brown 10YR(4/4) mottles, no odor, no PID response, moist, not bedded
7	17	10	NA	CL, as above; at 12 feet grades to CH - Silty CLAY, very dark grey 10YR(3/1),
				mottled with dark yellowish brown 10YR(4//6), soft, plastic, wet, no odor, no PID
				response, no apparent bedding; at 15 feet, grades to SC - Clayey, Silty SAND,
				very dark grey 10YR(3/1), very fine to fine grained in clayey, silty matrix,
				medium dense, slight organic odor, trace rootlets, wet, no PID response, no
				apparent bedding; at 16 feet, sharp gradation to SP - SAND, olive brown
				2.5Y(4/3), fine to medium grained, well sorted, rounded, loose, wet, no odor,
				no PID response, no apparent bedding; at 16.5 feet, abrupt change to MH -
				Clayey SILT, dark grey 10YR(4/1), soft, slightly plastic, wet, no odor, no PID
				response, very fine beds
17	27	6	NA	SW - SAND, olive brown 2.5Y(4/3), fine to medium grained, 10% silt, poorly
				sorted, rounded, loose, wet, no odor, no PID response; at 21 feet, grades to
				SP - SAND, grey 5Y(5/1), fine to medium grained, some coarse in 1/2 inch
				partings, well sorted, rounded, loose, wet, no odor, no PID response; likely
				lost sample from 23-27 feet bgs
27	37	10	NA	SP, SAND, dark grey 5Y(4/1), medium grained, some coarse, well sorted,

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Sample/Core Log (Cont.d)

Boring/Well RW-1

Page 2 of 2

Prepared by Larry Benolkin

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
				rounded, loose, wet, no odor, no PID response, no apparent bedding; at 33
				feet, abrupt change to GW - Sandy GRAVEL, dark grey 5Y(4/1), rounded to
				subangular gravel up to 5 inches, predominantly chert and limestone, clast-
				supported, 10-15% medium to coarse sand as above; at 35 feet, abrupt change
				to SM - Silty SAND, dark grey 5Y(4/1), some olive brown 2.5Y(4/4), fine to
				medium grained with 20% silt, poorly sorted, rounded, loose, wet, no odor,
				no PID response, no apparent bedding; at 36 feet, abrupt change to SW - SAND
				with Gravel, grey 5Y(5/1), fine to coarse grained, with 20% rounded gravel up
				to 1.5 inches, pooorly sorted, rounded, loose, wet, no odor, no PID response
37	47	8	NA	SW, as above; at 37.5 feet, grades to GW, GRAVEL with Sand, olive brown
				2.5Y(4/3), rounded to subangular gravel up to 4 inches inmatrix of medium to
				coarse sand, poorly sorted, loose, wet, no odor, no PID response, no apparent
				bedding; at 38.5 feet, abrupt change to SP - SAND, grey 5Y(5/1), fine grained,
				well sorted, rounded, loose, wet, no odor, no PID response, no apparent
				bedding; at 40.5 feet, abrupt change to SW - SAND with Gravel, olive brown
				2.5Y(4/3), medium to coarse grained, rounded, poorly sorted, with 30%
				rounded gravel up to 1.5 inches, loose, wet, no odor, no PID response; at 42
				feet, grades to SP - SAND, olive brown 2.5Y(4/3), medium grained, well sorted
				no odor, no PID response, no apparent bedding; lost sample 45-47 feet bgs
47	52	0	NA	Lost sample

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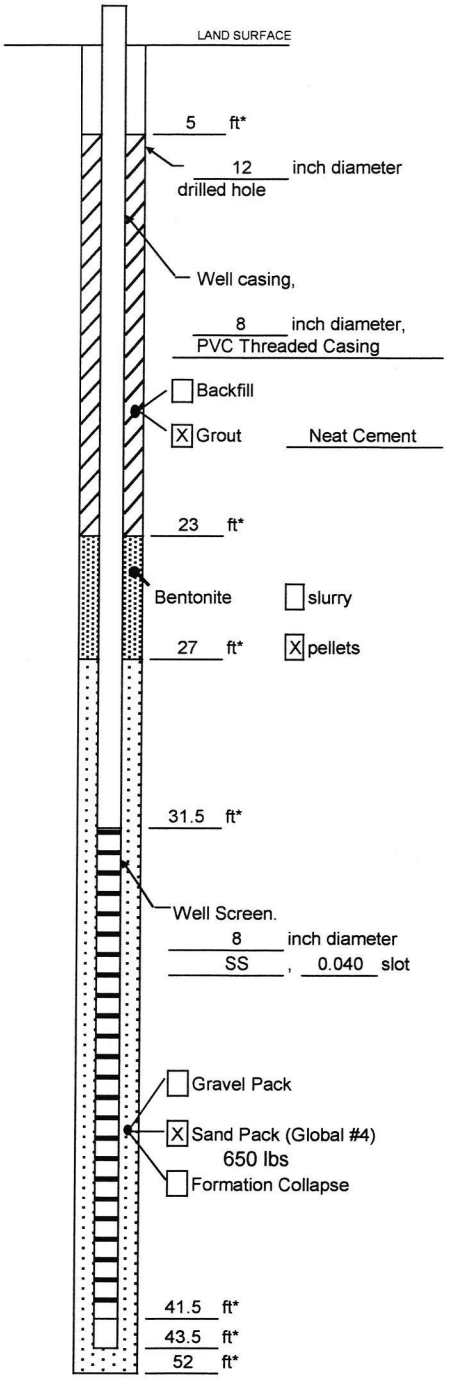
Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project Wyeth Well Installation KC001589.0001.00100 Well RW-1

Town/City Hannibal, MO

County Marion State MO

Permit No.

Land-Surface (LS) Elevation and Datum:

467 feet ☐ Surveyed

☒ Estimated

Installation Date(s) 12/06-07/2009

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Potable water

Development Technique(s) and Date(s)

Fluid Loss During Drilling ~1200 gallons

Water Removed During Development _____ gallons

Static Depth to Water _____ feet below M.P..

Pumping Depth to Water _____ feet below M.P.

Pumping Duration _____ hours

Yield _____ gpm Date _____

Specific Capacity _____ gpm/ft

Well Purpose Groundwater recovery

Remarks

Prepared by Larry Benolkin

G:/Aproject/Allegheny/RSE Results/Well Logs/RW-1 Unconsol Well Construction.XLS.xls
1/25/2011

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Sample/Core Log

Boring/Well RW-2 Project/No. KC001589.0001.0101 Page 1 of 2

Site Location: Hannibal - Northeast corner of Richland Bldg

Drilling Started: 930 12/5/2009 Drilling Completed: 12/6/2009

Total Depth Drilled: 47 Feet Hole Diamete: 12 inches Type of Sample/ Coring Device: Continuous

Length and Diameter of Coring Device: 10 feet by 7 inches Sampling Interval: 10 feet

Land-Surface Elev.: 470 feet [ ] Surveyed [X] Estimated Datum: Ground

Drilling Fluid Used: Plant Potable Water Drilling Method: Rotosonic

Drilling Contractor: Boart Longyear Driller: Darren Kern Helper: Jerry Beardmore

Prepared By: Larry Benolkin Hammer Weight: NA Hammer Drop: NA ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
Surface	5	0	NA	Air-knifed to clear utilities - Not recovered
5	7	2.5	NA	CL -C LAY, dark olive grey 5Y(3/2), stiff, medium plastic, trace bricks and
				some subangular limestone gravel, moist, no odor, no PID response, no
				apparent bedding, FILL
7	17	11.5	NA	CL, Silty CLAY, dark olive grey 5Y(3/2), some dark yellowish brown 10YR(4/4)
				mottling, stiff, medium plastic, moist, no odor, no PID response, no apparent
				bedding; at 9.5 feet grades to CL - Silty CLAY, dark olive grey 5Y(3/2) mottled
				with yellowish brown 10YR(5/6), some 1/4 inch black concretions, medium
				stiff, medium plastic, moist, no odor, no PID response, not bedded; at 13
				feet, grades to SC - Clayey SAND, olive grey 5Y(5/2) mottled with olive
				brown 2.5Y(4/6), very fine to fine grained, poorly sorted witin clayey matrix,
				very soft, slightly plastic, wet, slow dilantency, no apprent bedding, no odor,
				no PID response; at 16 feet grades to SM - Silty SAND, dark greyish
				brown 2.5Y(3/2), fine to medium grained, loose, wet, well rounded, poorly
				sorted with silty matirx, no odor, no PID response, no apparent bedding
17	27	10	NA	SM, as above; at 18 feet abrupt change to SP, ,SAND,, olive brown 2.5Y(4/3),
				fine grained, very loose, wet, no odor, no PID response, no apparent bedding;
				at 19.0 to 19.3 lens of SM - Silty SAND, greyish brown 2.5Y(5/2), very fine
				to fine grained, 20% silt, loose, wet, no odor, no PID response; at 19.3 feet,

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Sample/Core Log (Cont.d)

Boring/Well RW-2

Page 2 of 2

Prepared by Larry Benolkin

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
				SP, as above; at 21 feet grades to SW - well graded SAND, dark greyish
				brown 2.5Y(4/2), fine to medium grained, some coarse, poorly sorted, rounded,
				very loose, wet, no odor, no PID response, no apparent bedding
27	37	10	NA	SW, as above; at 30 feet grades to SP - SAND, grey 5Y(5/1), medium grained,
				some coarse, well sorted, rounded, very loose, wet, slight organic odor,
				no PID response, no apprent bedding; at 34 feet grades to GW - Sandy
				GRAVEL, grey 5Y(5/1), medium rounded gravel up to 4 inches, with 40%
				medium to coarse sand, loose, wet, no odor, no PID response, no apparent
				bedding; at 36.5 feet abrupt change to ML - SILT, olive grey 5Y(5/2), soft,
				non-plastic, wet, no odor, no PID response, possible very fine bedding
37	47	10	NA	GW - GRAVEL, light olive brown 2.5Y(5/3), poorly sorted subround to sub-
				angular gravel (predominantly chert and volcanics)15% medium to coarse
				sand, loose, wet, n o odor, no PID response, not bedded; at 38 feet, abrupt
				change to SP - SAND, light olive brown 2.5Y(5/3), medium grained, some
				coarse, well sorted, rounded, loose, wet, no odor, no PID response, no
				apparent bedding; at 38.5 feet abrupt change to GW - Sandy GRAVEL,
				light olive brown 2.5Y(5/3), rounded gravel up to 6 inches, poorly sorted with
				50% fine to medium grained sand, loose, wet, no odor, no PID response;
				at 39.5 feet, grades to SW - SAND, light olive brown 2.5Y(5/3), fine to
				medium grained, some coarse, poorly sorted, rounded, trace of black
				organic matter, loose, wet, no odor, no PID response, in gross 6-inch beds,
				becomes medium to coarse grained below 40 feet; at 41.5 feet, grades to
				SW - Gravelly SAND, light olive brown 2.5Y(5/3), fine to medium grained,
				with 30% gravel up to 6 inches, subrounded gravel, loose, wet, no odor, no
				PID response, no apparent bedding; at 44 feet, abrupt change to SM - Silty
				Silty SAND, very dark greyish brown 10YR(4/2), very fine to fine grained,
				sand with silt matrix,, medium dense, wet, no odor, no PID response; at
				45 feet, grades to SP - SAND, light olive grey 2.5Y(5/2), fine to medium

grained, well sorted, rounded, loose, wet, no odor, no PID response

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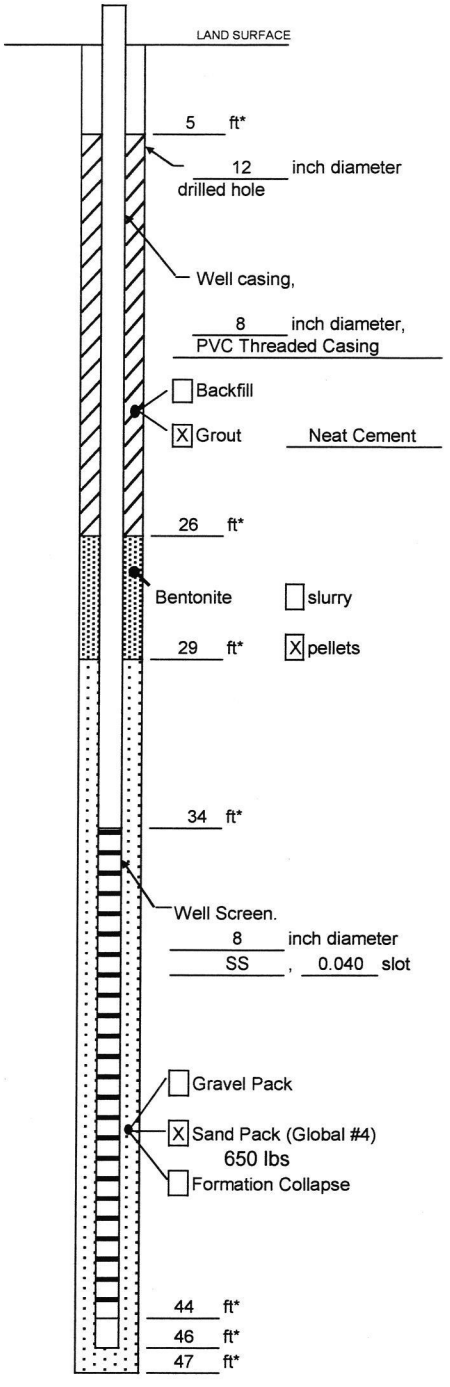
Well Construction Log

(Unconsolidated)



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Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project Wyeth Well Installation KC001589.0001.00100 Well RW-2

Town/City Hannibal, MO

County Marion State MO

Permit No.

Land-Surface (LS) Elevation and Datum:

470 feet ☐ Surveyed

☒ Estimated

Installation Date(s) 12/05-06/2009

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Potable water

Development Technique(s) and Date(s)

Fluid Loss During Drilling ~1400 gallons

Water Removed During Development gallons

Static Depth to Water feet below M.P..

Pumping Depth to Water feet below M.P.

Pumping Duration hours

Yield gpm Date

Specific Capacity gpm/ft

Well Purpose Groundwater recovery

Remarks

Prepared by Larry Benolkin

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Sample/Core Log

Boring/Well	RW-3	Project/No.	KC001589.0001.0101			Page	1 of 2
Site Location	Hannibal near Engineering Bldg			Drilling Started	1320 12/2/2009	Drilling Completed	1520 12/4/2009
Total Depth Drilled	46 Feet	Hole Diameter	12 inches			Type of Sample/ Coring Device	Continuous
Length and Diameter of Coring Device	10 feet by 7 inches					Sampling Interval	10 feet
Land-Surface Elev.	468 feet	☐ Surveyed	☒ Estimated			Datum	Ground
Drilling Fluid Used	Plant Potable Water					Drilling Method	Rotosonic
Drilling Contractor	Boart Longyear					Driller Darren Kern	Helper Jerry Beardmore
Prepared By	Larry Benolkin					Hammer Weight NA	Hammer Drop NA ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
Surface	5	0	NA	Air-knifed to clear utilities - No recovery
5	6	0.7	NA	CL -Silty CLAY, dark grey 10YR(4/1), medium stiff, medium plastic, moist,
				no odor, no PID response, no apparent bedding
6	16	11	NA	CL -Silty CLAY, dark grey 10YR(4/1) mottled with dark yellowish brown
				10YR(4/6), medium stiff, medium plastic, moist, no odor, no PID response;
				at 12.5 feet grades to CH - Silty CLAY, dark greyish brown 10YR(4/2) mottled
				with yellowish brown 10YR(5/8), soft, plastic, no odor, no PID response; at
				16 feet abrupt changes to SM - Silty SAND, fine to medium grained, well
				sorted, rounded, with silty matrix, dark grey 10YR(4/1), loose, wet, no odor,
				no PID response, no apparent bedding
16	26	9.5	NA	SM, as above; at 16.5 feet, abrupt change to CL- Silty CLAY, dark grey
				10YR(4/1), some dark yellowish brown 10YR(4/6) mottles, stiff, medium
				plastic, moist, no odor, no PID response; at 16.8 feet, abrupt change to SP -
				poorly graded SAND, brownish grey 2.5Y(5/2), fine grained, well sorted,
				loose, wet, no odor, no PID response, possible 1/4 to 1/2 inch clay lens at
				21 feet; at 24.5 feet abruptly grades to SP - poorly graded SAND, greyish
				brown 2.5Y(5/2), medium to coarse grained, moderately well sorted, sub-
				round to rounded, loose, wet, no odor, no PID response
26	36	9	NA	SW - well graded SAND, brownish grey 2.5Y(5/2), fine to medium grained,

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Sample/Core Log (Cont.d)

Boring/Well RW-3 Page 2 of 2

Prepared by Larry Benolkin

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description
				loose, poorly sorted, wet, no odor, no PID response, no apparent bedding;
				at 29 feet is a possible 1/4 inch clay lense; at 31.5 feet grades to SP -
				poorly graded SAND, brownish grey 2.5Y(5/2), medium to coarse grained,
				well sorted, loose, wet, no odor, no PID response, no apparent bedding;
				at 35 feet grades to SW - well graded SAND with gravel, brownish grey
				2.5Y(5/2), medium to coarse grained, 5-10% rounded gravel up to 2 inches,
				gravel is predominantly basalt and some limestone, loose, wet, no odor,
				no PID response
36	46	10	NA	SW - SAND with gravel as above; at 37 feet grades to GW - Gravel with sand,
				limestone and volcanics rounded gravel up to 6 inches in matrix of fine to
				medium grained sand, brownish grey 2.5Y(5/2); at 38.5 feet grades to SP -
				poorly graded SAND, light olive grey 2.5Y(5/4), well sorted, 5% gravel up
				to 1 inch, loose, wet, no odor, no PID response; at 41 feet grades to SP -
				poorly graded SAND, fine to medium grained, well sorted, loose, wet, no
				odor, no PID response, no apparent bedding; at 42 feet abrupt change to
				SP - poorly graded SAND, olive brown 2.5Y(4/3), fine to medium grained,
				well sorted, in first 6 inches black vitreous concretions up to 4 inches, loose,
				wet, no odor, no PID response, no apparent bedding; at 44 feet abrupt
				change to SP - poorly sorted SAND, yellowish red 5YR(4/6), fine grained,
				well sorted, loose, wet, no odor, no PID response, no apparent bedding

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Well Construction Log

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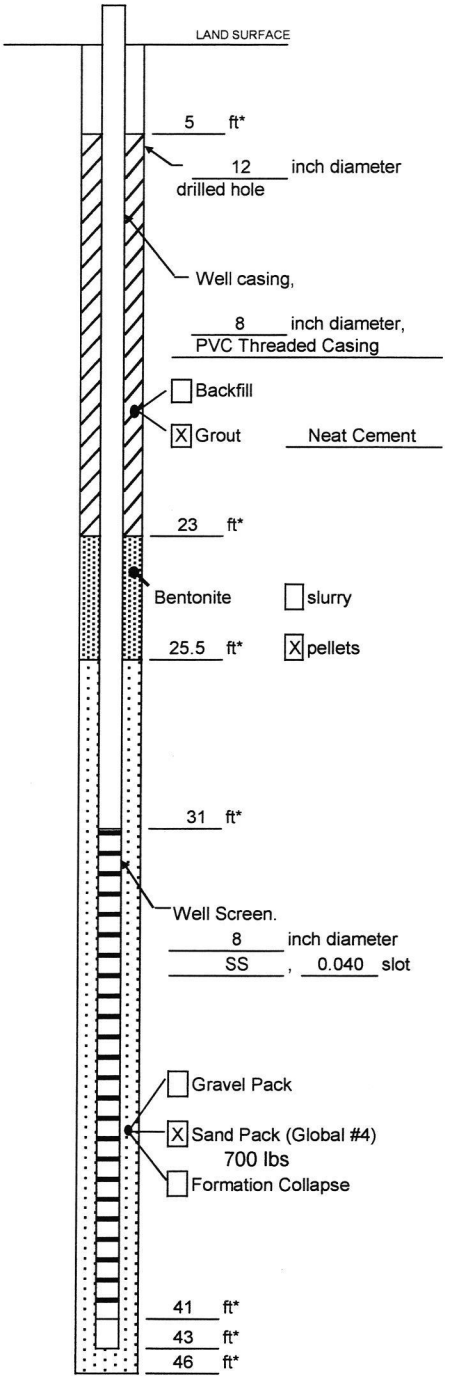

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Project Wyeth Well Installation KC001589.0001.00100 Well RW-3

Town/City Hannibal, MO

County Marion State MO

Permit No.

Land-Surface (LS) Elevation and Datum:

468 feet ☐ Surveyed ☒ Estimated

Installation Date(s) 12/02-04/2009

Drilling Method Rotosonic

Drilling Contractor Boart Longyear

Drilling Fluid Potable water

Development Technique(s) and Date(s)

Fluid Loss During Drilling ~1400 gallons

Water Removed During Development gallons

Static Depth to Water feet below M.P..

Pumping Depth to Water feet below M.P.

Pumping Duration hours

Yield gpm Date

Specific Capacity gpm/ft

Well Purpose Groundwater recovery

Remarks

Prepared by Larry Benolkin

G:/Aproject/Allegheny/RSE Results/Well Logs/RW-3 Unconsol Well Construction.XLS.xls
1/25/2011